The Chemical Age

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Notes and Comments

Five Months' Overseas Trade

WHILE the Board of Trade returns for May issued on Monday revealed a further big improvement in British trade, the aggregate exports for the month being greater than in any month since January, 1931, there was, for the second month this year, a slight decrease in the exports of chemicals, drugs, dyes and colours. Despite a decrease of £35,470 in March and a decrease of £12,994 in May, however, the total chemical exports for the first five months of 1935 still show an advance of £520,287 over the corresponding period of last year, and there is no reason to anticipate a continuance of the tendency which showed itself during the past month. In four of the five months of this year, imports of chemical products have shown decreases in comparison with 1934, the drop last month being £45,571, following an increase of £69,775 in April. Over the five months the total decrease has been £124,767

The real trend of the chemical industry is best shown by comparing exports and imports over the corresponding periods in the past three years. Thus, in the first five months of 1933 exports amounted to £7,399,267 and imports to £3,795,842, showing a favourable balance of £3,603,425. For 1934 the comparable figures were: Exports £8,033,255, and imports £4,759,331, giving a slightly lower favourable balance of £3,273,924. In the present year exports have amounted to £8,553,542 and imports to £4,634,564, showing a balance of £3,916,978. In addition to these movements there have been substantial re-exports of imported chemicals, fluctuating from £209,935 in 1933 to £534,870 in 1934 and dropping to £244,732 in the first five months of the present year.

The Sale of Poisons

AFTER prolonged deliberations involving the consideration of representations from 58 trade and professional organisations and the holding of over 40 meetings, the Poisons Board has placed before the Home Secretary the Poisons List and draft Poisons Rules, the compilation of which was one of the main purposes of the establishment of the Board in November, 1933. The Poisons List is divided into two parts, Part I consisting of those poisons which are not to be sold except by an authorised sell of poisons and Part II comprising poisons not to be sold except by an authorised seller of poisons or a person whose name is entered in a local authority's list of persons entitled to sell such specified poisons. The Poisons Rules have been drafted with the aim that they shall, together with the provisions of Part II of the Act, form a code that, whilst reproducing the main essentials of the existing restrictions wherever they are consistent with the objects and scheme of the Act, will strengthen and clarify them. The recommendations are based on the assumption that the object of the Act is, so far as is possible, to provide safeguards against accidents arising from mistake or inadvertance, to prevent the criminal use of poisons and to facilitate the detection of the criminal in any case of murder by poison.

Such of the Board's proposals as applied restriction to bulk trade met with criticism from the Association of British Chemical Manufacturers, which contended that the proposals went further than was necessary in the interests of public safety. The section of the Act referring to "sales by way of wholesale dealing" is capable of being interpreted as making such transactions free of all, or nearly all, restrictions, but the Board refuses to accept this view and points out that the bulk trade is by no means confined to the type of business carried on by members of the Association. Bulk trade, in fact, embraces anything from the sale of a ton or more of poisons from a chemical works to the purchase of a few grains of poison by a doctor. The Board takes the reasonable view that whilst such sales may be undertaken by wholesalers and manufacturers without the necessity of their becoming authorised or listed sellers, they should be subject to appropriate restrictions in regard to labelling, records, etc.

Division of Opinion on Lysol

THROUGHOUT the report of the Poisons Board there is only one item upon which there appears to have been a division of opinion, and that arose over the apparently simple question of lysol. A decision to retain lysol and dilutions of lysol in Part I (saleable only by authorised sellers of poisons) was taken by the vote of the majority of the Board. The word "Lysol" was registered by a German firm in 1890 as a trade mark describing disinfectants consisting of a soap solution of creosol, but in the early days of the war (November, 1914), the trade mark was "avoided," since when a great number of products have been put on the market under the name of "Lysol" and other names. They are solutions containing approximately 50 per cent of cresols in a saponaceous solvent, one of their characteristics being the formation of a clear solution with water. The British Pharmacopœia, 1932, includes "Lysol" as a synonym for liquor

cresolis saponatus, one result of which is that the specal standards of the Pharmacopœia would, we imagine, be held to apply to lysol when sold in circumstances which indicated that it was intended for medical use, *i.e.*, that it was a " drug." Prosecutions have been successfully taken against sellers of " lysol solutions " under the Food and Drugs Act for the offence of selling to the prejudice of the purchaser a drug which was " not of the nature, or not of the substance, or not of the quality of the article demanded," and also under the Merchandise Marks Acts for " selling goods to which a false trade description was applied."

The views of the majority of the Board are that as lysol is, next to coal gas, the most commonly used substance for suicide (the average annual number of fatalities over a period of eight years, including those classified as " accidental," being over 300), any relaxation of the restrictions at present imposed becomes difficult to justify; that, in view of the fact that lysol is a standard surgical antiseptic, it is important that products sold as "'lysol " should be of the standard laid down in the British Pharmacopœia; that the trade in bogus " lysol solutions " should be prevented; that in practice there is no misunderstanding of the meaning of the term " lysol " among those dealing with this substance; and that lysol is a substance used for the treatment of human ailments, and as such its inclusion in Part I is indicated by the wording of section 17. There is no evidence that the public require more facilities to purchase it than are available to-day, and the inclusion in Part II of the List of every other disinfectant with a phenol content up to 60 per cent. ensures an ample supply of efficient disinfectants.

The Minority View

THE minority of the Board point out that the suicide figures relate only to disinfectants labelled " Lysol," whereas the decision of the majority has been to include in Part I of the List all articles of the lysol type, many of them innocent in this respect. They doubt whether the control of the Act can be used effectively to combat suicide and consider that, in any event, the mere restriction of sale to authorised sellers of poisons would be insufficient, without additional restriction, to diminish the use of lysol for suicide. They point out that the high figure of 361 suicides from lysol in 1927 was reached whilst its sale was restricted to pharmacies. The use of lysol as a suicide agent in preference to other cresylic disinfectants, prepared either with or without soap, is due, they consider, solely to the fact that it is the disinfectant most commonly used by the public, and that the term " Lysol " has been given particular prominence in Press reports of suicides by such means. Apart from the incongruity of the appearance in the List of a substance not designated, as is every other substance in the List, by a scientific term, the minority feel that the inclusion of lysol in Part I and the inclusion in Part II of all other phenolic or cresylic disinfectants, many of them equally toxic, and equally capable of use as a means of suicide, and in fact so used, create an anomaly impossible to justify.

The minority consider that it is not within the functions of this legislation to ensure that a proper standard of strength or purity of a substance is maintained and that, as they understand that proceedings can be taken under both the Food and Drugs Act and the Merchandise Marks Acts against persons who sell as " Lysol " any article which does not conform to the standards laid down for lysol in the British Pharmacopœia, it is for the authorities responsible for the enforcement of those Acts to take such action as is necessary to protect the public from imposition. They are also of opinion that the restriction of the sale of dilutions of lysol to authorised sellers of poisons will not prevent the sale of weak disinfectants such as "lysol solutions." The most that can be done in this direction under this legislation is, they think, to remove the bar which has hitherto prevented shopkeepers other than authorised sellers of poisons from stocking effective disinfectants. They consider that the inclusion of lysol in Part I of the List will merely serve to perpetuate, in so far as lysol is concerned, the disadvantage that the average purchaser for domestic and kindred purposes, instead of going to a chemist and getting from him a really effective article which, because it is a poison, he cannot get elsewhere, inclines to buy from a grocer or general dealer an inferior article, bearing, perhaps, the same or similar name, not a " poison," but one which, as a disinfectant, is inefficient in fact.

A Lower Sickness Rate

AN investigation to determine the effect of the regular administration of Vitamins A and D on the sickness absence rate of factory staffs is described in the May issue of " Progress," the house magazine of Lever Brothers, Ltd. The results show a consistent lowering of the rate. During the months October to March, 1933-34, a group of about 300 of the staff at Port Sunlight received the vitamin capsules daily, and their sickness absence rate was compared with the rate displayed by a similar group of 300 who did not take the extra vitamins.

Another experiment was begun in October, 1934, with a vitamin group of about 550 persons and a control group of about 850. The figures of this experiment are given for the four months to January last. The results of the two experiments may be summarised as follows. The figures are for 100 persons.

	No. of absences		Hours lost	
	C'trol Group	V't'min Group	C'trol Group	V't'min Group
Experiment I. ...	70.5	53.5	2,397	1,555
Experiment II. ...	33.6	28.4	1,037	784

In 1933-34 the main causes of absence were influenza, bronchitis and colds. In 1934-35, not only has there been less illness, as the above figures show, but also relatively less influenza and bronchitis.

A BRISK demand for tung oil in the German market is reported and imports reached the largest quantity on record during 1934. Unusual activity in industries using substantial amounts of paints and varnishes was regarded as the principal reason for the exceptional call for tung oil. German imports of tung oil in 1934 totalled 8,245 metric tons, an increase of nearly 30 per cent. over 1933 imports and at least 2,000 tons higher than the yearly average from 1927 to 1933, inclusive. This trade expansion continued in 1935 as records of imports for two months show tung oil receipts at 888 tons, a further increase of 20 per cent. over those of the corresponding two months of 1934. Practically all the tung oil imported into Germany comes directly from China. An average of about 300 tons of tung oil has been re-exported annually from Germany during recent years, principally to neighbouring countries in Europe, particularly Czechoslovakia, Austria, and Sweden. The trade is unimportant and apparently not likely to increase, but it indicates that German importers are interested in the small transit trade in tung oil.

The New Poisons List and Rules

Poisons Board Issues an Explanatory Report

THE Poisons Board established in November, 1933, under the Pharmacy and Poisons Act of that year, and presided over by Sir Gerald Bellhouse, has submitted to the Home Secretary the Poisons List prepared under section 17 of the Act, and a draft of the Poisons Rules which it recommends should be made under section 23 (H.M. Stationery Office, 1s. net). The list and rules are accompanied by an explanatory report, in which the Board states that its deliberations disclosed a considerable number of chemical, medical, legal and commercial problems of a highly detailed character, often difficult to solve, necessitating the appointment of a number of sub-committees which held 24 meetings in addition to 18 meetings of the full Board.

An examination of the Report of the Departmental Committee on the Poisons and Pharmacy Acts made it appear that the aim of the Board's work should be the construction of a new code to replace the existing legislation that will cease to apply when the Poisons List and Rules come into operation. The new code should, it concluded, resemble the present restrictions in their main essentials, but at the same time be free from the several defects to which the Departmental Committee drew attention.

Organisations Consulted

As any change in the specification of substances that the law regards as "poisons," and in the restrictions imposed upon them, would affect not only the practice of medicine and pharmacy but also several branches of industry, commerce, agriculture and horticulture, the Board thought it well, before submitting definite proposals, to consult a number of organisations that appeared likely to be affected. It accordingly circulated a first draft of provisional proposals. The wide publicity afforded to the draft by trade journals led to the receipt of observations not only from the selected organisations, but also from several others and from numerous individual firms. The Board considered all the observations received, and substantially amended its original proposals in respect of several of the matters upon which representations were made. Among the organisations consulted were the Association of British Chemical Manufacturers, Association of British Insecticide Manufacturers, Association of Tar Distillers, Association of Wholesale Druggists, British Association of Chemists, British Chemical and Dyestuffs Traders' Association, British Disinfectant Manufacturers' Association, Institute of Chemistry, Paint Federation, Pharmaceutical Society, and Wholesale Drug Trade Association.

The dangers for which the Board considers the control of the Act should be applied for the protection of the public may be classified as the danger of death or injury following (1) the administration of a poison for criminal purposes, (2) the swallowing of a poison in mistake for an innocuous substance, (3) the inhalation, through ignorance or by accident, of the vapours given off by a poison, (4) the incorrect compounding of medicines containing poison, and (5) the accidental taking in too large a dose of a medicine containing a poison.

Special Dangers

Special dangers arising in connection with the storage and transit of poisons and the distribution of poisons otherwise than from retail shops include (1) poisoning as the result of contamination of food in transit or in warehouses, (2) poisoning by fumes from containers bursting or leaking in transit, and (3) poisoning of workers in industrial processes from products the toxic effects of which may not be generally known or appreciated. The danger arising from contamination of food arises only from such poisons as will leave the food apparently unspoilt. These are included in the List. The poisons giving rise to the danger of poisoning by fumes include some, such as hydrocyanic acid, that have a distribution outside industry, and others such as, for instance, bromine and liquefied chlorine, the uses of which are for all practical purposes confined to industry, but which, if they should escape from a faulty container, for example, on a motor lorry in a crowded thoroughfare, might, as poisons, do considerable damage. As, however, this danger appears to be confined in practice to transport by road, and as rules are, it is understood, to be issued under the Petroleum (Consolidation) Act, 1928, for the control of the transport by road of dangerous liquids and liquefiable gases, it is not proposed to include any "industrial" poisons in the List solely on the ground of the possibility of danger arising during transit.

The protection of workers from poisoning in industrial processes is primarily a function of the Factory and Workshop Act, 1901, but there is one aspect of the problem that appears to be appropriate to the legislation relating to the control of poisons. Various poisonous substances are introduced in industry from time to time and in increasing numbers. Recent accidents, and others during the war, for example in aeroplane factories, have shown the risk of substances having insidious toxic properties, particularly volatile substances, being employed in ignorance of the safeguards required. To minimise such risks it may be desirable that the manufacturers and importers of such substances should be required to label the container with an adequate warning of the character of the contents and the precautions which should be taken when it is used. For this purpose it would be necessary to include in the List all "industrial" poisons of a character so dangerous as to require such a cautionary notice on the container, and it would perhaps be advisable, as the dangers of these poisons arise in practice only in industry, to exempt them from the application of the remainder of the provisions of the Act and Rules controlling the sale and supply of poisons where the latter are inappropriate.

Industrial Poisons

Included in these "industrial" poisons are certain halogenated substances some of which, notably carbon tetrachloride, are also retailed to the public. Carbon tetrachloride is used in medicine as an anthelmintic and will cause death if taken in too large a dose or too frequently. At the same time there is also a considerable sale to the public of carbon tetrachloride as a cleaning agent or fire-extinguishing fluid, generally in very small quantities, from garages and several other types of establishment. The use of carbon tetrachloride by the public in these small quantities does not present any considerable danger. The inclusion of carbon tetrachloride in the List without qualification would result in an unnecessarily large variety of vendors having to become entitled to sell poisons. In these circumstances it is recommended that this substance should be included in Part I of the List, but that, except in the case of medicines, it should be exempted from the application of the Act and Rules (Second Schedule).

The board is advised by Sir William Willcox that the use of carbon tetrachloride and other similar halogenated substances in industry, particularly in dry-cleaning establishments, is so dangerous as to require that these substances should be supplied for such use only in containers bearing a caution to the effect that they should not be employed except with proper ventilation. It is proposed, therefore, that they should be considered for inclusion with the above-mentioned "industrial" poisons at a later stage.

Articles in Common Use

In deciding the distribution of poisons between Part I and Part II of the List the Board has borne in mind the direction that "regard shall be had to the desirability of restricting the said Part II to articles which are in common use, or likely to come into common use, for purposes other than the treatment of human ailments, and which it is reasonably necessary to include in the said Part II if the public are to have adequate facilities for obtaining them," and also the view of the Departmental Committee that "broadly, Part II of the Poisons List will embrace some poisonous preparations used for sanitary, industrial, horticultural or agricultural purposes, or as sheep dips or vermin killers." It infers from these two indications that it was not intended that the degree of toxicity should be the governing factor in the allocation of substances as between the two Parts of the List. On this principle (except in the case of preparations for the

treatment of human ailments), once it is established that a substance is in common use and requires a general distribution, that substance should be placed in Part II of the List, irrespective of its toxicity; any public danger which may be considered to arise from the presence of poisons on the premises of unqualified persons being a matter to be dealt with by rules according to the circumstances of the particular case. It later recommends that rules should be made restricting, in the case of the more dangerous poisons placed in Part II of the List, both the classes of person who may sell them and the manner and form in which they may be sold by persons other than authorised sellers of poisons.

Animal Medicines

There is a considerable retail sale of animal medicines containing poison to farmers, cattle and horse breeders, poultry keepers and private owners of horses, dogs, cats and poultry by persons who are not lawfully "keeping open shop." Such sales appear to be illegal under the existing law and will, but for any rules dispensing with its provisions, become legal under the Act only in so far as the sale is to a person for the purpose of his trade or business. Much of the trade is in the hands of manufacturing firms who deal direct with the animal owner or poultry keeper. As the system of the control to be extended to listed sellers does not appear appropriate in the case of manufacturers (the Act appears to contemplate that only shopkeepers will require to be listed with the local authority), it is recommended that provision should be made by rule whereby animal medicine manufacturers may be permitted to continue the retail sale of their products. The Board suggests a rule exempting the sale of certain poisons when contained in animal or poultry medicines by animal medicine manufacturers from such requirements of section 18 as restrict the retail sale of poisons to authorised sellers of poisons and persons registered with the local authority, provided that the manufacturers fulfil certain conditions. These conditions will enable the enforcing authorities to know who the manufacturers in question are, and where they are, and to cause their premises, records, etc., to be inspected should occasion require. The exemption should be restricted to certain specified poisons which are in common use.

Agricultural and Horticultural Poisons

Under the heading of "household" poisons the Board has in mind poisons such as those to which section 5 of the Poisons and Pharmacy Act, 1908, applies and to meet the public needs it has included in Part II of the List solutions of ammonia, formaldehyde, caustic potash, caustic soda and sulphuric acid. After careful consideration it has decided not to include in Part II of the List any of the acids to which section 5 of the Poisons and Pharmacy Act, 1908, applies other than sulphuric acid.

In the case of poisons used in agriculture and horticulture the Board has included in Part II of the List several arsenical substances, sodium fluorides, sodium silicofluoride, nicotine, sulphuric acid and various compounds of mercury, the use of all of which for the destruction of various pests is common and should be encouraged. These preparations may appropriately form part of the stock of the retailer who supplies the farmer and the horticulturist with their general requisites, for the latter naturally desire to purchase their insecticides, sheep-dips, etc., at the shop or stores at which they customarily obtain their accessories, and do not wish to be required to obtain them elsewhere. There are other poisons used in agriculture and horticulture, such as cyanides, but the farmer and horticulturist may without hardship be required to purchase these either direct from the wholesaler, who is entitled to sell poisons to persons for their trade or business, or from an authorised seller of poisons. Their properties are so dangerous that they should not be obtainable at any retail shop other than that of an authorised seller of poisons.

Although the Board recognises the importance of effective vermin killers being readily available to the public, it considers it undesirable in the interests of public safety that so large a range of such dangerous substances should have the wide distribution afforded by the Act to the poisons in Part II of the List. It considers that the inclusion in Part II of barium carbonate, the poison most commonly used for the purpose, will sufficiently meet the public needs under this head. Red squill, the safest and most effective vermin killer, is not included in the List.

The only poisons in common use as disinfectants and requiring to be placed in Part II of the List in order that the public may have adequate facilities for obtaining them are the phenols. Except as regards lysol and dilutions of lysol, the Board is in general agreement that Part II of the List should include substances containing less than 60 per cent. of phenols. This will permit adequate facilities to the public for obtaining all phenolic disinfectants, other than lysol and dilutions of lysol, which are in common use, and also phenolic weed killer, sheep dips and phenolic products used in agriculture and horticulture.

The Board is divided in opinion as to the treatment to be given to lysol, and the decision to retain in Part I of the List lysol and dilutions of lysol was taken by the vote of the majority of the Board.

The Poisons Rules

Dealing with the Poisons Rules, the report states that the recommendations are based on the assumption that the object of the Statute is, so far as possible, to provide safeguards against accidents arising from mistake or inadvertence, to prevent the criminal use of poisons and to facilitate the detection of the criminal in any case of murder by poison. The principal safeguard against the accidental taking of a poison that can be provided by legislative regulation is a control designed to ensure that persons handling poisons are made aware that they are doing so, either by means of a cautionary label or by markings on, or by the shape of, the container. In this connection the Board stresses the fact that little can be done by way of regulation to prevent the accidents which occur from time to time through the negligence or folly of individuals. The point of greatest danger to the public from poisons is in the homes of the public, and here the only protection from the risk of accident must be the exercise of intelligence by the individual citizen. Many fatalities would be avoided if greater precautions were taken by the public in the keeping of poisons, particularly if it became the accepted practice in every home for articles labelled "Poison" or "Caution" to be kept together in one place, preferably under lock and key, away from other articles and out of the reach of children. A liquid poison should never be kept, as it so frequently is, in an ordinary bottle, but only in the bottle in which it has been bought.

The Importance of Labelling

Poisons should in all circumstances be labelled with an appropriate warning, irrespective of the class of seller (manufacturer, wholesaler, etc.) or of the type of purchaser (private individual or trader). Alarming accidents have resulted from arsenic, for example, not being labelled as such in the wholesale trade. Moreover, in the case of proprietary articles, retailers must in practice to a large extent rely upon the wholesaler or manufacturer to warn them of the poisonous contents of the article they sell and the name of the poison in question. It is proposed, therefore, to apply the labelling provisions of the Act at every stage of distribution from the manufacturer downwards. Poisons for export should be exempted as they do not constitute a danger to the public in this country, except in regard to their storage and transport, and they must, in practice, be labelled to comply with the requirements of the importing country. All liquids for external application should be labelled with the name of the article, such as "liniment," "lotion," etc., and with a caution that they are not to be taken internally. All liquid poisons other than medicines, sold or supplied in bottles containing 120 fluid ounces or less, should be labelled with the words "Not to be taken." The only further safeguard against mistake that appears to be necessary is a requirement that bottles of the size of a Winchester quart or less should be fluted vertically when containing a liquid poison other than one to be taken internally.

The Board finds it impracticable to adopt any specific safeguard against the inadvertent taking of an overdose of poison in a medicine beyond that which can be secured by the restriction of the retail sale of medicine containing a poison to authorised sellers of poison, medical practitioners, dentists and veterinary surgeons. Several members of the Board have observed with some concern that in practice no medicine need be labelled with the word "Poison" or other cautionary words, since they feel that there are certain drugs, notably those of the barbituric acid group and others generally sold in tablet form, frequently in bottles of fifty or a hundred, the dangers of which should be brought to the notice not only

of the patient, lest he should be tempted to take the drug in a greater dose or at more frequent intervals than those prescribed, but also of anyone else who may take it believing the medicine to be innocuous. The medical and pharmaceutical members of the Board, on the other hand, point to the established custom whereby the information given on the container of a medicine does not disclose the name or character of its ingredients, and represent that any change in this respect would be strongly opposed by the medical profession, which finds that it is not always beneficial to treatment that the patient should learn the nature of the drugs prescribed.

The Association of British Chemical Manufacturers represented that such provisional proposals as applied restriction to " bulk trade " went further than necessary in the interests of public safety. In using the term " bulk trade " the Association has, no doubt, in mind the trade of its own members. But it is to be appreciated that " sales by way of wholesale dealing " and the other sales specified in section 20 of the Act include, at the one end of the scale, the sale of a ton or more of poison from a chemical works, and, at the other, the supply of a few ounces of insecticide to a professional gardener or even a few grains of a poison to a doctor, dentist or veterinary surgeon, etc. Again, the sales may be undertaken by concerns varying considerably in the type of business in which they are engaged. Such a concern may be a firm employing thousands of workpeople or merely a " one-man " business engaged in re-bottling, or simply re-labelling, such things as disinfectants manufactured by someone else.

The Board has not included arsenical weed killers in the second column of the Fourth Schedule. Although it has received representations from several quarters in regard to the point it has not felt able to advise that arsenical weed killers should be given the wide distribution afforded by the listed sellers, for the fact cannot be ignored that arsenical weed killer has been the poison employed in several cases of murder, and that both in the liquid and powder forms it requires unusually careful handling if disastrous accidents are to be avoided. These facts might not of themselves justify the prohibition of the sale of arsenical weed killer by listed sellers if it were an article which is both in common use and required, in the public interest, to be given a wider distribution. But the Board is satisfied that there is no such need, for there are on the market equally efficacious weed killers consisting of substances other than arsenic. As in the representations made to the Board, weed killer has been associated with sheep dips, it is pointed out that from their nature sheep dips require to be sold only in country districts, and then only to sheep farmers, whereas the distribution of weed killers occurs also in urban areas and is not restricted to any class of user.

The increasing use of compressed hydrocyanic acid for the extermination of bed bugs may lead to disister if persons not experienced in fumigation with this gas should attempt to employ it. With a view to reducing this risk the Board recommends that every container should be required to be labelled with a warning to the effect that the contents should be used for fumigation only by persons expert in fumigation with this gas

The Home Secretary has given formal notice of his intention to make the Poisons Rules after the expiration of forty days from June 18. It is intended that the rules shall come into force on May 1, 1936, from which date the various existing statutory provisions and regulations relating to the sale, supply, storage and transport of poisons will be repealed. Similar notice has also been given regarding the confirmation of the Poisons List from the same date.

Colloidal Clay in Soap-Making

A Notable Consumption Foreshadowed

THE Laundry Research Institute, Russia, has lately undertaken a considerable amount of research in connection with the use of colloidal clay in soaps, and the possibility of utilising some of the important deposits of kaolin near Moscow for this purpose is being put to practical test. Rehbinder and his colleagues appear to have reached the same general conclusions as to the colloidal nature and properties of soap and clay solutions or suspensoids as were established by McBain, Martin Fischer and numerous other workers in this field. It is now agreed that washing is a colloidal process in which adsorption phenomena are important. Soap is adsorbed by many substances, and its concentration on the surfaces of the adsorbing bodies is the chief factor in its detergent action.

According to Rehbinder, detergent action is dependent both on the surface activity and the surface stability of aqueous soap solutions, and on the formation—due to aggregation of molecules and micelles—of a film and ultimately of a viscous-plastic skin around the dirt particles. Emulsification, peptisation and lather-forming properties are also essential. Washing agents may thus be divided into three groups: (a) surface active preparations such as soap, (b) solid emulsifiers such as washing clays, and (c) solvents. It is emphasised that agents of the second group are of particular interest and importance, and that they differ in some important respects from true soaps in their colloidal character. On the other hand, despite the fact that soaps and clays differ fundamentally in chemical composition, the physical nature of their solutions is very similar. For example, their surface tensions are lower than that of water—an important point in detergent action—their viscosities are greater than that of water, and they both possess emulsifying power, adsorb dirt and grease, and have powerful detergent action. Further, it is now well established that the addition of a colloidal clay, such as Stockalite, to soap enables it to lower the surface tension of water to a greater extent than does soap alone. For example, a high-grade toilet soap containing 25 per cent. of colloidal clay (Stockalite) lowered the surface tension 10 per cent. more than the pure soap.

Weston's work on clay soaps is well known, and a description thereof was given in the " Soap Gazette " (1920). A fairly full summary will be found in Martin's " Soaps and Detergents " (Vol. 2), together with some account of the earlier patents of Feldheimer and others. Improved methods of preparing colloidal clay, especially suitable for soap-making, have for some time been employed by English Clays, Ltd., working under their own patents. Apart from these there have not been many new patents published. In French Pat. 748,890 (Corbineau), glycerinated water is added to the clay before mixing it with the saponified constituents, whereby it is said that larger amounts of clay may be incorporated in the soap and the product generally is improved. In U.S. Pat. 1,873,296 (Roy Cross, assr. to Silicate Products Co.), a clay product suitable for use in cements, soaps, etc., is obtained by mixing natural clay with about 5 per cent. of sodium silicate and about 3 per cent. of one or more of the chlorides of ammonium, calcium or barium.

Although Searle did not consider clay a suitable ingredient for toilet soaps, though excellent for textile purposes, this view must be materially modified in view of recent improvements and developments. As a matter of fact, owing to its valuable property of absorbing free alkali, colloidal clay is a very useful constituent of many toilet soaps and is in itself an excellent emollient with germicidal and disinfecting properties.

It is hardly necessary to point out that, since clay is cheaper than oil or fat, the use of colloidal clay in soap-making is a definite economy and at the same time improves the quality of the soap. It may therefore safely claim to be regarded more as a genuine constituent than as a mere filler, still less as an adulterant under the stigma of which it was placed by Watt in the old days. The colloidal clay of to-day, as prepared by the best methods, is quite a different material and is not only finding increased application in toilet and other soaps, but also in cosmetics and toilet preparations generally. It is no longer correct to judge a soap solely by the criterion of fatty acid percentage content. Although, of course, the colloidal character of a soap, and especially its water-holding capacity, varies widely according to the fatty acid or acids used in its composition, the fatty acid content, of itself, affords little real guidance as to the true quality of the soap and its detergent powers.

Production of Motor Spirit from Tar

WITH the publication of two reports* dealing with the conversion of tars into motor spirit the Department of Scientific and Industrial Research offers a substantial contribution to an economic problem of considerable national importance. A consideration of the statistics of production shows that the commercial value of the two million tons of tar produced annually fluctuates widely according to local conditions and demand, and it is obvious that some means of stabilising the position would be advantageous. The development of the so-called "low-temperature" carbonisation of coal is providing a still further supply of tars whose products, if still complying with existing specifications, can be disposed of through the same channels as gas and coke oven tars, although, in view of these added supplies, extended outlets are even more desirable.

A very promising line of attack on this problem appears to be the production of fuel oil and motor spirit from the tar through the action of hydrogen at high temperatures and pressures, and this has been actively investigated at the Fuel Research Station for some years.

In this process the hydrogen probably combines with the molecules of substances already present in the tar. Some of these molecules are very complicated and when combined with hydrogen are unstable under the conditions of heat and pressure. Consequently they break up or "crack" into the smaller molecules of hydrocarbons, including those suitable for use as motor spirit and fuel oil. Hence the name "hydrogenation cracking" has been given to the process. In practice the process is carried out in the presence of a third substance—known as a catalyst—which not only hastens the reaction but guides it in the desired direction. Very little is known about the reasons why substances act as catalysts, and apart from the knowledge gained by experience the selection of a catalyst is often a matter of trial and error.

Early Exploratory Work

The first of the papers now issued deals with the early exploratory work in this connection. It was decided in the first place to limit the work to small-scale experiments, using converters of 2-litre capacity and to restrict attention to low-temperature tar. It was to be expected that the results obtained would be dependent on such factors as the temperature and pressure in the reaction vessel, the duration of the period of reaction, the possibility of catalytic action and the nature of the tar itself. Several series of experiments were therefore planned in each of which certain factors were varied and the remainder left constant.

The first series aimed at determining the best possible conditions in the converters. The results showed that a hydrogen pressure of 100 atm., a temperature of 450° C. and a reaction period of two hours gave the best results. In the second series these conditions were adopted and the effect of a wide variety of catalysts was tried. The general conclusion is that a mixture of commercial molybdic acid and sulphur was the most effective substance.

Attention was then turned to varying the tar used as a raw material, maintaining the condition as before. The tars were obtained from different low-temperature carbonisation processes, from five coals of different types carbonised in vertical cast-iron retorts, and four coals carbonised at rather higher temperatures in narrow vertical brick retorts. The tars in the first two groups show little difference in their amenability to hydrogenation-cracking, but those of the third were definitely more difficult to treat, though it is realised that this may be in part due to the adoption of standardised conditions of temperature, pressure and catalyst, which are not necessarily the best for all types of tar.

Discontinuous Converters

In the small discontinuous converters used for these experiments the pressure, and therefore the hydrogen concentration, varied as the reaction proceeded. The results were therefore not necessarily applicable to a continuous plant such as would normally be used in large-scale operations, and some experiments were at this stage carried out in the Bergius plant at the Fuel Research Station. Having been designed for the hydrogenation of coal, this plant was not altogether suitable for the treatment of tar, but the results were nevertheless very satisfactory. With this larger plant there was the further advantage that sufficient spirit could be produced for actual running tests in internal combustion engines.

Work at the Fuel Research Station

The results of such tests are given in some detail in the report and show the spirit to be particularly high in anti-knock properties; a slight deficiency in low-boiling fractions caused this particular spirit to be a little inferior to ordinary petrol as regards ease of starting and acceleration, but this would easily be overcome by modifying the conditions under which the hydrogenation was carried out. The report also includes the results of some preliminary experiments on the production of lubricating oil from the heavier fractions of the hydrogenation product.

Preparation of the Catalyst

The second paper now issued deals wholly with the important question of the preparation of the catalyst to be used in hydrogenation-cracking. In a continuously-operated plant the catalyst may be supplied to the converter as a definite proportion of the material being treated, or it may be held in a static condition while the raw material passes over it. The first of these methods has certain disadvantages, and it was therefore decided to use the second. The requirements of a static catalyst are that it should be granular so as to be easily retained in the system and allow of the free passage of the vapour or liquid, and highly porous so as to present as large a surface as possible to the reacting materials; it should be sufficiently strong to withstand normal handling and mechanical disturbance in the plant without appreciable disintegration; and it should have a high thermal conductivity to ensure the rapid distribution of the heat of reaction. The most promising method of preparing a material satisfying these conditions appeared to be the distribution of the catalyst over a strong and highly-porous support.

Starting with the assumption that a sulphide of molybdenum is the best catalyst for hydrogenation-cracking, a number of catalyst supports were examined to determine which would give a prepared catalyst satisfying the above requirements. Further experiments were then carried out on enhancing the activity of the catalyst by a pre-heating treatment and on its reactivation after prolonged use.

Alumina Gel as a Catalyst Support

The results of these experiments indicate that a suitable catalyst for the hydrogenation-cracking of tars or tar oils may be prepared by igniting granular alumina gel to a dull heat and impregnating it with ammonium molybdate in aqueous solution. Certain active carbons gave supported catalysts of higher initial activity, but they suffered from the disability that they could not readily be reactivated. The activity of the alumina-gel-supported catalyst is shown to be increased by preheating in air at 500° C. for several hours, and the same treatment restored its original activity after deterioration due to continued use.

THERE was increased activity at mercury mines in the United States in 1934, with the result that domestic production was 60 per cent. larger than in 1933 and was slightly in excess of the average for the ten-year period, 1924-1933. Increased production was in part in response to the increased price for mercury, which was 25 per cent. higher in 1934 than in 1933. Since domestic mines supplied a larger part of the demand there was a shrinkage in demand for imported metal and therefore imports for consumption in 1934 were only one-half those for 1933. California was, as usual, the largest producing State, contributing 51 per cent. of the total production.

* Fuel Research Technical Paper No. 40 "Hydrogenation Cracking of Tar. Part I. Preliminary Experiments" (H.M. Stationery Office 2s. net). Fuel Research Technical Paper No. 41, "Hydrogenation Cracking of Tar. Part II. The Preparation of a Catalyst." (H.M. Stationery Office 6d. net.)

Chemical Industry and the Oil Problem

THE I.C.I. coal hydrogenation scheme, in its development and in its practical working, is essentially a process for the chemical industry. It would be useless entrusting the collieries with the operation of such a plant. Already the process as originally devised by Bergius has been improved in this country, but whether it will ever be possible to manufacture oil from coal by hydrogenation at such prices as will compete with the untaxed natural product must remain doubtful. Nevertheless, the present need to produce at home has caused the Germans to make considerable efforts to utilise this process. According to the German papers it is expected that 300,000 tons will be produced by the I.G. hydrogenation process by the end of 1935. The Trust of the Brown Coal Works estimates its annual production at about 400,000 tons of petrol, whilst coke ovens and gasworks may be able to raise their production of benzol to 350,000 tons per annum. In addition the distillation of brown coal and German mineral oil will produce approximately 150,000 tons of petrol. In this way the whole production of light oil will amount to 1.2 million tons per annum, which, with the addition of industrial alcohol, will yield 1.35 million tons of spirit annually. This figure is said to represent just over 70 per cent. of the total consumption of motor spirit in 1933.

Brown Coal Hydrogenation

As has been already announced, the brown coal industry in Germany has been compelled by the authorities to hydrogenate part of the output. The plant of the I.G. Farbenindustrie, at Leuna, operates mainly upon brown coal and oil residues. The known fact that liquid products are easier to hydrogenate than coal has caused the German producers to operate upon oils wherever possible. The company formed compulsorily to hydrogenate brown coal, the Braunkohlen-Benzin A.G., first carbonises the coal at low temperature to obtain the oils and then hydrogenates the oils. Very similar is the method of the Coalite Company, in England. It appears that the hydrogenation of coal could produce all the liquid fuel required in a state of emergency and that it may well prove, when developed a little farther, to be an admirable method of treating all the oils and tars that are derived from coal at low and medium temperature, even in competition with imported, tax-free mineral oil. Development, however, depends upon the cost of the hydrogen. There is one cheap source of hydrogen that has yet remained untouched, namely, that derived from the gases given off towards the end of the carbonising period in coke ovens and gasworks; if this were to be separated by a double gas main from the richer gas that precedes it, a cheap source of hydrogen would be available that could be used for oil hydrogenation.

Hydrogenation Processes

The conversion of coal into oil by hydrogenation involves the conversion of a material that initially contains some 5 or 6 per cent. of hydrogen into one containing 11 or 12 per cent. of hydrogen, or, if the operation is to produce low boiling oils, into a product containing as much as 14.5 per cent. of hydrogen. There is also another way of proceeding with the same problem; we may remove *all* the hydrogen from the coal and then put it—and possibly other elements—back again.

In this process the coal is first converted into coke and the coke is considered as the raw material for further treatment; this has the advantage that coke of inferior quality can be used for the production of liquid compounds and that the other (high-grade) coke can be sold profitably. There are two processes of this character, both in large-scale operation. One of these is the now well-known methanol process, in which carbon monoxide and hydrogen are used to produce methyl alcohol according to the reversible equation:

$$CO + 2H_2 \leftarrow\rightarrow CH_3OH.$$

The synthesis may start with water gas, as is done by the Société Franco-Belge D'Ougrée at their works at Bully les Mines, France. At the works of the Société d'Ougrée Marihaye and also of the Société Courriéres-Kuhlmann, the raw material is coke oven gas from which the $CO—H_2$ mixture is prepared by oxidising the methane contained in the gas according to the equation: $CH_4 + H_2O = CO + 3H_2$, the percentage of hydrogen in the mixture being subsequently adjusted by water gas. Frequently the gases used are themselves to some extent a by-product, the hydrogen being derived from that which is not required for the synthetic ammonia process practised on the same works.

Present Position Reviewed

The practical details of the operation of the plant are not easy to secure and in papers read upon the subject they are wrapped in mystery. A recent paper before the Institute of Fuel, for example, contained a wonderful account of the methods used in making the reaction mixture and in converting the methane in CO and hydrogen—but nothing was said about the methanol plant. In 1928 the United States Bureau of Mines sought to provide itself "with first-hand information on reactions and processes bearing on the production of liquid fuels from coal" and found that "the industrial production of synthetic methanol abroad has been known for some time, and in May, 1927, an industrial production of 4,500 gal. daily was announced by one American company," but "the catalysts employed are not stated, though numerous combinations of metal oxides have been disclosed by patents granted."

Zinc-Chromium Catalyst

It would appear that a zinc-chromium catalyst is frequently used in which zinc nitrate solution is added to dilute sodium chromate solution, the precipitate being washed free from nitrates, dried at 80° C. and finally reduced in hydrogen at 300° C. It is used at high pressures between 300° and 400° C. and yields of between 70 and 95 per cent. of the theoretical have been found by investigators. In practice some 80 per cent. of the CO used in the reaction gases is converted into methanol. The information already given concerning works where this process is used suggests that considerable quantities are now being produced, but its low calorific value seems to make it unlikely that the oil fuel problem can be completely solved by the production of methyl alcohol.

A process of considerable interest is that of Franz Fischer who, starting with coke as the raw material, is able to produce good yields of oils varying in character from the lightest hydrocarbons to solid waxes and paraffins. It would not be surprising to find that this process ultimately became of more importance than the others, though this opinion must be qualified by the remark that no costs have as yet been given. The process could be applied in any chemical works that can purchase coke, and does not depend upon the prior possession of coke ovens or other major plant that evolves as a by-product the gases needed for the synthesis. This does not mean that coke oven gas and similar gases cannot be used; the essential necessity is to start with a mixture of carbon monoxide and hydrogen suitable for the catalyst in use. With a cobalt catalyst the reaction proceeds according to the equation:

$$CO + 2H_2 = (CH_2) + H_2O$$

and when iron is the catalyst:

$$2CO + H_2 = (CH_2) + CO_2$$

where the expression CH_2 is to be taken as being a constituent of a liquid hydrocarbon molecule.

The Most Suitable Metals

The catalyser metals best suited for this reaction are iron, cobalt and nickel, all metals that have the common characteristic of being able to form carbides. Fischer believes that either the normal carbide X_3C is formed and reacts with hydrogen to reform metal and to evolve "CH_2," or that the normal carbide first formed is converted by the agency of carbon monoxide into a higher carbide, which changes back under the action of hydrogen into the normal carbide. It is suggested that these reactions are: with iron at 250° C.

$$H_2+2CO+Fe_3C=Fe_3C_2+H_2+CO_2=Fe_3C+(CH_2)+CO_2$$

and with cobalt and nickel below 200° C.

$$2H_2+CO+Co_3C=Co_3C_2+H_2+H_2O=Co_3C+(CH_2)+H_2O$$

The use of the pure metals is unsatisfactory and the best conversions are attained by using mixed catalysts. Many years

of work have been expended upon the production of the correct catalysts, as it has not only been necessary to find that catalyst which will give the maximum degree of conversion, but also to ensure that it did not lose its activity too rapidly. For example, an iron-copper-manganese catalyst deposited upon silica gel gave a conversion of 30 to 35 grams of product per cu. metre of gas, but lost its activity by 20 per cent. within eight days. At the other end of the scale a cobalt-thorium catalyst deposited on kieselguhr gave a yield of 110 grams and did not sink to 80 per cent. activity until it had been in use for 60 days. The effect of the addition of the secondary catalysts to the main catalyst is interesting; copper, for example, facilitates the start of the reaction by lowering the initial temperature, and is effective with iron, but detrimental with nickel.

(To be continued.)

Preventing the Photochemical Decomposition of Food

By A. H. PETTINGER, B.Sc., A.I.C.

THERE has been much discussion recently on the question of adding preservatives to food in order to inhibit deterioration due to light, air and bacterial influences, and many chemical antiseptics have come in for serious criticism by medical experts and others interested in health matters. It would appear clear to everyone that the addition of chemicals like boric acid, formalin and salicyclic acid was undesirable, but the accompanying problem of how to ensure that food reaches the consumer free from decomposition is not altogether easy of solution.

A promising contribution to the solution of this question arises out of research work done in the last two years, by food specialists in England and in the United States. on the action of light in initiating chemical changes in fatty foods, and the prevention of such changes by wrapping the food in a coloured paper, such as, for instance, the cellulose foil known as Cellophane. As far back as 1920, Hammer and Cordes noted the effect of keeping milk, cream and other liquid fats in white and in coloured bottles. Storage in clear colourless bottles, through which all the rays of light in the spectrum could freely penetrate, resulted in the milk or cream "turning" and acquiring a tallowy flavour in a few hours. When kept in a dark brown bottle, however, they noted that no taint developed even after very prolonged exposure in bright sunlight with slight rise in temperature, for several hours.

Influence of Oxygen and Coloured Lights

From more recent research it is now known that no fat will turn rancid in complete lack of oxygen and so the present investigations have been conducted in such a way that the material under test is subjected to both oxygen and lights of various colours in order to ascertain in which medium the greatest degree of decomposition occurs. Thus G. R. Greenbank and G. E. Holm, of the Bureau of the Dairy Industry, U.S. Department of Agriculture, placed cottonseed oil and other fats in a tube connected with an oxygen burette and directed a beam of light from a 500-watt Mazda lamp upon it, infra-red rays being filtered out by a screen of copper sulphate solution. They found as a result that under intense illumination this oil absorbed oxygen 65 times as quickly as a similar specimen not irradiated. The rate of oxygen absorption by a fat is, of course, a measure of the speed of chemical decomposition taking place and hence the accelerating effect of the light is too obvious to need comment.

They next tried various colours on the tube of oil in contact with oxygen, and again found the amount of oxygen taken up with each different colour. Dyes were used in the manufacture of the light filters and, in order to ensure that equal energy was being transmitted by each, they made careful measurements and adjustments with the aid of a thermopile. Thus the figures obtained need no modification, and the variation in actinic power between the different colours is worthy of consideration. This treatment was continued eight hours in each case.

Wavelength of transmitted light. (A)	Colour.	Absorption of oxygen in ccs.
4450 to 4950	Upper blue	2.6
5100 5660	Green	1.65
5540 5940	Yellow	5.0
6100 6650	Orange	9.2
6500 7250	Red	1.1

Another method by which Greenbank and Holm determined the rate of chemical decomposition of oil was by noting the speed at which methylene blue was reduced in contact with it.

Similar investigations have been going on in England at the National Institute of Research in Dairying, Reading. Davies has recently described experiments wherein butter fat and the oil of biscuit meal was wrapped in Cellophane paper of various colours. Under such conditions 40 hours exposure to direct sunlight did not cause appreciable increase in formation of oxidised substances to samples covered with deep blue, deep green and dark red foil, whereas similar specimens wrapped in light blue foil, pink, lemon and orange were as badly oxidised as unwrapped samples. Light green and heliotrope coloured Cellophane showed evidence of an intermediate degree of auto-oxidation.

In the bottling of fruit juices, Carpenter has shown that green bottles are to be preferred from the point of view of prevention of chemical degradation by light and that apple, kraut and other juices retain their fresh odour and freedom from turbidity longer when stored in such a container.

A somewhat similar experiment has been reported by Coe and LeClerc. Fat-containing foodstuffs such as butter, lard, potato chips and biscuits were wrapped in coloured Cellophane and exposed to light. The tendency to rancidity was observed from aural examination, odour, flavour, etc., as well as by means of the rancidity tests of Schiff and Kreis, from time to time. The best results were obtained when the commodities were wrapped in green paper or dark red. Their general conclusions were that ultra-violet and visible light both greatly accelerate the oxidative action, and regarding the visible rays those of wavelength 6,000 to 6,500 Angstrom units were most strongly active. They recommend green light filters which transmit radiation of the wavelength range 4,900 to 5,600 Angstrom units.

A brief study of the existing informataion on this interesting subject indicates that a green-coloured wrapping paper is called for with any fat-containing foodstuff, and dyestuff makers would be well advised to watch for further developments in this field. At the present time a green foil wrapping is easily possible of achievement from the practical standpoint, but is hardly likely to be looked upon with favour by the purchasing public. After all, appearance is a very vital factor in buying and selling food, and a commodity obscured in an unattractive coloured foil may be a very sound proposition from the scientific point of view, but it will not succeed in the economic sense if visual appeal is wanting. There would seem to be a big future for the dyestuff manufacturer who can produce a colour with similar properties photochemically speaking and yet capable of dyeing up on Cellophane attractively. The number of dyes tested for absorbtive properties is very small so far, and it is not inconceivable that a thorough investigation would reveal several useful screening colours amongst the pinks and pale yellows.

PAINT stocks in Cuba are on the increase, although orders are larger this year than during the first four months of 1934, Despite the falling-off of business during the first week of March, the turnover has increased until April sales were giving every indication of being the largest for the year. More American paint manufacturers are planning to operate mixing plants in Cuba, as it has been found necessary to import paint in bulk to secure the large volume of sugar mill or oil paint business. Prospects are good, as very little painting has been done in Cuba for several years, with the result that mills and water tanks are in poor condition. Eighty per cent. of raw paint materials are being imported from Europe.

Death of Professor Julius B. Cohen

Recognised Authority on Organic Chemistry

THE profession of chemistry has lost a distinguished leader by the death of Professor Julius Berend Cohen, F.R.S., which occurred at his residence at Coniston on June 14. Professor Cohen, who was 76 years of age, was for twenty years Professor of Organic Chemistry at Leeds University. He was the son of Sigismund Cohen and was born in Manchester on May 6, 1859. He studied at Owens College, Manchester, and graduated B.Sc. at the old Victoria University. After two years at the works of the Clayton Aniline Co. he went to Munich and took the degree of Ph.D. From Germany he returned to Manchester and was appointed demonstrator in chemistry. In 1890 he moved to the Yorkshire College, Leeds, as lecturer in organic chemistry. When the college was reconstituted as the University of Leeds he was appointed Professor of Organic Chemistry, and held the chair until his retirement in 1924, when he received the honorary degree of D.Sc. He was also honorary LL.D of Glasgow.

During the 33 years of his service at Leeds he proved himself a brilliant and original teacher, and endeared himself to his colleagues, to many generations of students, and to the citizens of Leeds by his sterling qualities of character, kindliness of heart and gentle charm. He took a keen interest in the welfare of the Working Men's Club in East Leeds.

To the several branches of organic chemistry Professor Cohen made a large number of original contributions, while his text-books are used by students all over the world. He paid particular attention to the problem of smoke in towns, and was a member of the Departmental Committee on Smoke Abatement. In 1911 he was elected F.R.S., was a member of the Chemotherapy Committee of the Medical Research Committee, 1924-32, and an associate member of the Chemical Warfare Committee. He served two terms as vice-president of the Chemical Society.

Brilliant War Service

In the war Professor Cohen did splendid service. The outbreak found the country faced with a great shortage of synthetic drugs, including many commodities for which the war hospitals made an immense demand. One of the most important was novocaine, a substitute for cocaine, which was made under patent only in Germany. Professor Cohen responded to the general appeal of the Government, and a department was organised at the University, the members of which worked without remuneration, overcame immense initial difficulties, and manufactured something like a pound a day of these valuable anæthetics.

When the Germans adopted chemical warfare, Professor Cohen became a member of the committee which devised defensive measures, and another interesting work was the invention of an invisible ink, which proved too much for the German chemists, and was used by our Intelligence Department. When on his retirement he was awarded the honorary degree of D.Sc. by Leeds University, it was said of him that his name was famous in scientific circles as that of a recognised authority of the highest standing in the domain of organic chemistry. He had made more than 80 original contributions, advancing our knowledge of organic chemistry, and of the factors entering into the smoke nuisance and had written a number of text-books used the world over by thousands of students.

As far back as 1896 Cohen wrote "A monograph on the Air of Towns" for the Hodgkin Prize Fund Committee, by whom it was published. Professor Cohen was an enthusiastic musician and a skilled artist in water-colour. His other hobbies were gardening and tennis. He married a daughter of Mr. and Mrs. William Hughes, of Manchester, and she survives him. He leaves also one son and two daughters. His elder son was killed in the war.

(Photo. by courtesy of Yorkshire Post)

Professor Julius B. Cohen.

The funeral took place at Coniston on Tuesday.

Professor Arthur Smithells, formerly Professor of Chemistry at the University of Leeds, paid the following tribute to Professor Cohen in the "Yorkshire Post" on June 15:

"It is impossible in words to do any sort of justice to Professor Cohen. His character as a man, his services not only to his science but to his fellow creatures, were so outstanding as to call for no ordinary terms of praise. It would be difficult to find a man who has more completely spent, in the interests of the world, the endowments with which he set out on the path of life. Multitudes of his students, many of them now leaders in science, will in their sorrow be longing to bear witness to what Professor Cohen has meant to them, not only in their professional efficiency but in the conduct of their lives. The praise of him in the scientific community will go far beyond his own students, for he, more than any man, has provided the educational books of organic chemists for the whole English-speaking world. Though a man going almost to excess in modesty and the love of retirement, and his dislike of the limelight, Professor Cohen's long and splendid service to the University, his breadth of culture, his artistic talents, and, above all, the rare personal charm that truly expressed his inward grace, must be well known in the city of his adoption.

"His care for the cleanness of the air, as of all things, led to pioneer services of great importance in that national cause. Characteristic in high degree was his quiet and long-continued labour in founding a club of education and recreation for young men in the York Road district. At their beautiful cottage at Coniston he spent his last days in ideal retirement with the wonderful companionship of his life-partner, who cared so completely for his well-being and his work."

Sir James Baillie, Vice-Chancellor of the University of Leeds, also wrote: "Professor Cohen was an invaluable and delightful member of the staff from all points of view. In his many activities—his pursuit of scientific ideals, his interest in music and art—he had numerous friends, and represented all that is best in the University. His presence was an inspiration, and he was the best of colleagues and beloved by his students. He was a great scientist."

Successes and Failures in Chemistry Examinations

Views of the Institute Examiners

THE June issue of the Journal and Proceedings of the Institute of Chemistry publishes an abstract of the report of the board of examiners upon the April-May examinations, in which there were 72 candidates, of whom only 38 passed.

In the examination for the Associateship in general chemistry two candidates failed to satisfy the examiners in their theory papers only, and one in the practical work only. Two candidates failed only in organic theory, two in organic practical, and one in inorganic practical. Two candidates failed only in German translation, and one in French only. In the examinations for the Fellowship the only candidate in organic chemistry satisfied the examiners in his written papers, but was obliged to withdraw from the practical work owing to illness. One candidate in chemistry and microscopy of food and drugs failed to satisfy the examiners in his written papers and in his practical work in therapeutics, pharmacology and microscopy, and one candidate failed only in practical therapeutics, pharmacology and microscopy. One candidate in industrial chemistry satisfied the examiners in his written papers, but failed to do so in his practical work.

The examiners state that in the examination for the Associateship in general chemistry in the written papers on inorganic chemistry the questions proved well within the capacity of the better candidates, and, with one exception, were very generally attempted. The exception was the question relating to the colour change of cobalt salts, which was attempted by only three candidates. It seems strange, they state, that there is not more general interest in this remarkable phenomenon.

A Common Error

A common error was to write of a *reduction* of ammonium dichromate to chromate, in which, of course, no reduction in the chemical sense is involved. Since a number of those making this error formulated the change correctly, it seems probable that the mistake is due to a careless use of words, quite inexcusable in the case of a term having so clear and important a connotation in chemistry. The same tendency is seen in other matters; for example, the confusion of hydrolytic with ionic dissociation and of liquid crystals with solid solutions. Every student should realise the great importance of learning and using the language of chemistry with meticulous precision.

In the case of organic chemistry, the organic theory paper was, on the whole, poorly answered by the weaker candidates. The aliphatic portion of the subject was better known than the aromatic. Too few of the candidates were well acquainted with the common reactions and properties of aromatic compounds. Few candidates knew the action of nitrous acid on *o*-phenylenediamine, many prepared indigo from aniline through anthranilic acid, and the formula $C_6H_5\,COOH$ was frequently given for benzilic acid. The $C_6H_5\,COOH$ question on oximes produced uneven answers, but quite a number of candidates knew nothing of the views on this subject initiated by Meisenheimer as long ago as 1921. Candidates are becoming better acquainted with the methods of consulting the literature, though some still seem to be unaware of the standard formulæ indexes. The practical organic exercises were carried out better than usual, and quite a good standard was attained.

In the examination for the Fellowship the written papers on chemistry, including microscopy of goods, drugs and of water were well answered. The question on milk, involving a calculation on the content of non-fatty solids, produced, however, some rather disappointing answers. While all the candidates were well acquainted with the cryoscopic examination of milk, relatively few considered in any detail the really significant points which govern a final opinion as to abnormality. Those candidates who were employed in the laboratories of drug or pharmaceutical business houses showed weakness when confronted with milk or milk product problems. They would be well advised to remedy this defect by obtaining experience, if possible, in the laboratories of public analysts or other laboratories where food products are dealt with daily.

It was again notable that many candidates had no thorough experience of problems connected with water. They may have performed many analyses along conventional lines but were not clear as to their interpretation. Candidates would be well advised to avail themselves of any opportunities to visit waterworks and sewage disposal works in order to improve their knowledge of the mechanism of the biochemical reactions and processes involved. It is a matter for surprise that many candidates use the soap test as a specific one for the estimation of total and permanent hardness in water. The presence, as in the present case, of sodium bicarbonate misled certain candidates, but, on the whole, this exercise was well performed.

A much higher all-round level of proficiency was reached in practical work than in previous examinations. In the examination of the margarine, the required constants were accurately obtained, and in only one or two cases was an incorrect opinion expressed. The presence of prohibited colours or preservatives was detected. The baking powder gave little difficulty; candidates, on the whole, being very near the mark in their general opinion on its quality. The wording of the question relating to whisky might have been read with greater care. Candidates would be well advised to spend the first quarter of an hour or twenty minutes of the day thinking over the problem and all that it demands. They would thus conserve time and energy.

The microscopical work was, in general, quite the most satisfactory part of the examination. The diagnostic features of the individual spices were well illustrated and correctly described.

A pleasing feature of the examination in therapeutics, pharmacology and microscopy was the generally high level shown in the practical work, and the general handling of the sample of stomach content, which contained linimentum belladonnae. The papers were less well done, and some of the candidates would do well to familiarise themselves with more recent methods. A few seem to have had little or no opportunity of studying crude drugs. This is a definite part of the examination and cannot be ignored. Taking the candidates as a whole, the standard was better than usual.

Carbon Black Production

Summary of Operations in 1934

THE United States carbon-black industry, which had given indications of recovering from the depression in 1933, made marked progress in 1934. Although the indicated plant demand in 1934 was considerably under the total of 1933, prices were approximately 30 per cent. higher and it is probable that profits were larger despite the increased costs under the code signed February 8, 1934. Production of carbon black in 1934 was 328,828,000 lb., an increase of 20 per cent. over the output in 1933. Stocks at the plants which had shown a material decline in 1933, due to speculative buying before the anticipated rise in prices, increased approximately 16,000,000 lb. in 1934. In 1934 the centre of the carbon-black industry remained practically stationary as production in Louisiana showed approximately the same percentage increase as that in the Texas Panhandle. The output of carbon black in the Texas Panhandle was 72 per cent. of the total output of the United States in 1934; the production in 1934 totalled 237,403,000 lb., an increase of 12 per cent. over the production in 1933.

The average yield of carbon black declined from 1.44 lb. in 1933 to 1.43 lb. in 1934, probably a reflection of the gain in the relative importance of channel blacks. The carbon black industry utilised 229,933,000,000 cu. ft. of natural gas in 1934, compared with 190,081,000,000 cu. ft. in 1933. Exports of carbon black decreased 21 per cent. in 1934. The United Kingdom, France, and Germany, in the order named, continued to be the leading customers. The value of carbon black exports for 1934 was $5,541,143, or practically the same as in 1933, indicating that increased prices compensated the loss in volume.

Heavy Chemical Production in Japan

A Review of Trade Conditions in 1934

THE production of heavy chemicals in Japan has now reached a point where there is in many cases a surplus for export, according to a report on "Economic Conditions in Japan," by Mr. G. B. Sansom and Mr. H. A. Macrae, commercial counsellor and commercial secretary to the British Embassy at Tokyo, lately published by the Department of Overseas Trade (H.M. Stationery Office, 3s. 6d. net). Dealing generally with the Japanese situation, the report states that during a period of world depression Japanese production has shown a remarkable increase, export trade has flourished and the country has in some measure escaped the evils of industrial unemployment from which other countries are suffering. The growth of industrial activity has benefited the leading export industries and the industries supplying military and naval requirements, but there is still distress in many agricultural areas.

According to the Ministry of Commerce the production of soda ash during the period January to October, 1934, amounted to 134,061 kilo tons, and as 15,285 tons were produced in October the total for the twelve months is estimated at 165,000 kilo tons. Of this quantity probably 6,000 tons were converted into 8,000 tons of bicarbonate of soda, leaving 159,000 tons of ash to be sold as such. Imports for the twelve months are given as 35,700 tons (actual deliveries 34,000 tons), making a total of 193,000 tons of soda ash The estimated consumption for the year was 160,000 tons, and exports amounted to 16,000 tons, leaving a surplus of 17,000 tons.

Caustic Soda Production

The estimated total production of caustic soda for the year 1934 was 173,972 tons, and imports actually delivered totalled 10,000 tons, making a total of 183,972 tons. The estimated consumption was 160,000 tons, and exports were 13,000 tons, leaving a surplus of 10,972 tons of caustic soda.

Japan produced an estimated total of 8,000 tons of bicarbonate of soda and imported 2,500 tons (actual deliveries 2,000 tons), making a total of 10,000 tons. Estimated consumption was 8,000 tons and exports 1,700 tons, leaving a surplus of 800 tons.

Sulphate of ammonia produced during the twelve months was estimated at 805,192 tons, and a further 222,100 tons were imported. Consumption in Japan, Chosen and Taiwan was estimated at 1,020,000 tons, and exports at 1,500 tons, leaving a surplus of 5,792 tons.

Cyanamide production was estimated at 137,378 tons and consumption at 130,000 tons, leaving an estimated surplus of 7,378 tons.

The production of alkalies increased steadily throughout the year, and there is every indication that the peak reached in October, 1934, will be maintained, if not exceeded, in the future. A forecast for 1935 by a good authority is as follows:

Soda ash.—Production 195,000 tons, estimated imports 30,000 tons, total 225,000 tons, estimated consumption 175,000 tons, leaving 50,000 tons, estimated exports 20,000 tons, surplus 30,000 tons.

Caustic soda.—Production 201,000 tons, estimated imports 10,000 tons, total 211,000 tons, estimated consumption 180,000 tons, leaving 31,000 tons, estimated exports 15,000 tons, surplus 16,000 tons.

Bicarbonate of soda.—Production 9,600 tons, estimated imports 2,000 tons, total 11,600 tons, estimated consumption 8,000 tons, leaving 3,600 tons, estimated exports 2,000 tons, surplus 1,600 tons.

Shortage of Sulphate of Ammonia

A shortage of 100/120,000 tons of sulphate of ammonia was anticipated in the spring of 1934, but owing to the abnormally small rainfall, particularly in Korea, over 220,000 tons had to be imported to make up the deficiency between supply and demand which increased considerably owing to the advance in prices of rice and silk. For the same reasons it is expected that at least 150,000 tons will be imported during the calendar year 1935.

The production of cyanamide is regulated by the domestic demand and will, it is expected, be of the order of 140,000 tons in 1935.

The import and export trade in Japan in the lighter chemicals is shown in detail in monthly and annual returns of Japan's foreign trade. Imports exceed exports, the figures for the year 1934 being, approximately, imports 45 million yen and exports 23 million yen.

Recent developments in the petroleum industry are of more than usual interest in view particularly of the enforcement from July 1, 1934, of the new petroleum industry law, which affords an important example of the manner in which the Japanese Government's policy of industrial control may affect the undertakings of foreign producers and traders. The increase in the consumption of petroleum products in Japan continued in the last two years as shown in Table I.

The Petroleum Market

With the expansion of manufacturing in Japan, the improvement of roads, and the increasing mechanisation of industry and transport, it would seem that the market is still far from saturation point; and, since Japan has but small petroleum resources and must depend largely upon imports, the two large foreign oil groups, with their long-established importing and distributing organisations in Japan, seemed in a fair way to benefiting considerably from the growing demand.

But the Japanese Government, regarding the supply of petroleum products as a matter of national importance, has long considered it advisable to introduce some measure of control over this industry, and at last, in 1934, introduced the petroleum industry law of which the declared objects were to stabilise the market and to encourage refining. The law was passed by the Diet, which, however, added a rider to the effect that nothing must be done to interfere with the smooth supply of petroleum products.

TABLE I.

Estimated Consumption of Principal Petroleum Products in Japan, Korea and Formosa.

(Tons.)

	Benzine.	Kerosene.	Gas oil.	Lubricating Oil.	Diesel and Fuel oil.
1932	615,800	171,200	163,400	172,600	973,400
1933	653,800	165,800	156,700	191,000	1,092,900
1934	769,700	179,000	174,800	244,800	1,252,800

TABLE II.

Estimated Crude Oil Supplies, in Tons, 1934.

Production in Japan	252,600
Formosa	7,100
Total Japanese production	259,700
Total imports	1,083,400
Total supply	1,343,100

TABLE III.

Principal Manufactured Petroleum Products in 1934

Tons.

Products.	Benzine.	Kerosene.	Gas oil.	Lubricating Oil.	Diesel and Fuel oil.
Manufactured from domestic crude oil (Japan and Formosa)	41,700	13,600	40,900	41,800	26,800
Manufactured from imported crude oil ..	318,400	53,600	147,500	166,700	122,100
Imported	426,900	99,900	—	34,700	1,127,000
Total supply ..	787,000	167,100	188,400	243,200	1,265,900

Foreign Anxiety

The foreign oil interests view with great anxiety the provisions of the petroleum industry law. They feel that, whatever its objects, its effect may be discriminating against them by diverting trade to Japanese concerns, and, quite apart from the question of a reasonable share in the natural increase of trade, to make even the protection of their vested interests impossible without a further capital outlay which they consider oppressive. They have therefore appealed to the Japanese Government for relief from some of the hardships which the law imposes upon them; and conversations between their representatives and responsible officials are now in progress. The control policy of the Government has raised issues

of great complexity and importance, not only for the suppliers but also for the Government itself, since, whether the petroleum is imported in crude form or as refined products, Japan depends for her supplies principally upon imports. Thus, as to crude oil, the position is approximately as shown in Table II.

These figures do not include imports for the Japanese Navy from California, the Netherlands Indies and Northern Sakhalin. Japanese concessions worked in Northern Sakhalin produce about 200,000 tons of crude oil per annum; and this amount, together with some 100,000 tons from Soviet Union-operated wells, is imported into Japan and for the most part purchased by the Navy as fuel oil.

The position in respect of the principal manufactured petroleum products was approximately as shown in Table III in the year 1934.

It will be seen that over 80 per cent of the crude oil supply comes from sources outside Japanese territory, and about 93 per cent. of the supply of petroleum products is either imported or manufactured from imported crude oil. The extent of Japan's dependence upon foreign supplies is slightly diminished if account is taken of production which, though not in Japanese territory, is in Japanese hands, *i.e.*, part of the production in Northern Sakhalin and the production of shale oil at Funshun, Manchuria, amounting in 1934 to some 50,000 tons and, it is anticipated, to be doubled in 1935.

Importance of Milk in the Food Industry

Food Group Summer Meeting

A LARGE gathering of food chemists from all parts of the British Isles attended the summer meeting of the Society of Chemical Industry's Food Group at the Carrow Works of J. and J. Colman, Norwich, on May 24 and 25. The first day of the meeting was devoted to a conducted tour of Carrow Works, and on the second day a conference was held under the general title of "Milk as a Raw Material of the Food Industry."

Dr. T. RUDDOCK-WEST, Medical Officer of Health for Norfolk, dealt with requirements for a clean milk supply. He made some criticism of the present attitude of public health authorities to the testing of milk supplies. Only tested milk, he said, should be placed on the market in a raw state, and as the purchaser was entirely dependent upon the public health authorities with their facilities for testing supplies much more sampling should be undertaken than was done at present. If the milk was not passed as fit for consumption in the raw state he had no hesitation in stating that this should be sterilised, for, if efficiently carried out, the process was an excellent safeguard. "I do feel that pasteurising plants should be established at definite depots and be subject to strict supervision," remarked Dr. Ruddock-West.

Dried Milk in Baking Industry

Dr. E. A. FISHER, of the Flour Millers' Research Association, in an address on "Dried Milk in the Baking Industry," stressed the importance of variety in diet and urged the carrying out of a "Bread and Milk" campaign. "Ailments connected with dietary," he said, "are probably due as much to ignorance of how to feed as to actual deficiencies in the diets available, while in the latter case the deficiencies are not only in the vitamin content; many troubles are due to lack of proper balance among the other food constituents and especially among the mineral constituents." The consumption of bread per head had decreased markedly of recent years and an "Eat More Bread" educational and publicity campaign was being carried out energetically with a view to altering the trend of decreasing consumption. The consumption of milk per head in this country was one of the lowest of the western civilised nations and attempts were also being made to increase this. These activities could well be supplemented by a "Bread and Milk" campaign to increase the consumption of these two products in combination.

To be successful, such efforts should be based on five considerations. In the first place, bread should be improved in quality and better made, for much commercial bread was not well made; its flavour should be improved; if possible there ought to be an increase in its nutritive (energy) value and a better balance as regards its mineral and vitamin content, and it should be given better publicity. The problems of better balance and improved flavour could be met by incorporating dried milk products in bread during the course of manufacture either of the flour or of the bread. Already the baking industry consumed large quantities of dried milk products, mainly in the manufacture of small goods, but they could also be used in bread with markedly beneficial results, and such "mixed" bread was of better keeping quality. The use of dried milk products would also benefit the dairy industry by increasing the consumption of milk by reducing the transport difficulties inherent in the handling of liquid milk products and by eliminating waste. As regards the latter, butter-milk, separated milk and whey could be utilised in the same manner as whole milk. "At present," stated Dr. Fisher, "these materials when made in butter and cheese factories are largely waste products; it has been estimated that 40,000,000 gallons of whey containing 13,700 tons of highly nutritious matter are poured into the drains of Great Britain annually."

Dr. J. G. DAVIS, of the National Institute for Research in Dairying, Reading, in a paper on "Some Biochemical Aspects of Cheese-Ripening," gave details of the history and development of cheese-making. Cheese-ripening, he said, involved the production of aroma (flavour) and a good body ("feel") and texture (appearance), as well as the breakdown of the protein. Broadly speaking, flavour was controlled by biological, body and texture by physical and chemical, and proteolysis by enzymic factors. As in all fermentations, it was far more important to ensure the right conditions for growth of the desired micro-organisms than to inoculate them artificially. "Cheese-making," said Dr. Davis, "may be considered to have evolved through experiment from crude beginnings to a highly-skilled art. The fact that milk could clot and form a curd was probably first discovered when it was carried in animal skins or came in contact with crushed vegetable tissue."

A Synthetic Cheese Flavour

Different kinds of cheese were now made by variations in the methods of manufacture which produced different kinds of curd. These were associated with physical and chemical conditions and in turn led to differences in flora. Local varieties of cheese probably arose in the first instance by accident, and their development had undoubtedly been controlled by local conditions, such as richness of grassland, and by demands both local and external. Some good authorities were of opinion that all varieties of cheese might be made anywhere given a sufficiently skilled maker. It must be pointed out, though, that prizes for cheeses such as Cheshire and Stilton were taken mostly by cheeses made in their own areas. Although accurate chemical knowledge of the substances responsible for the characteristic flavours of different types of cheese was so far lacking, there was no reason why a synthetic cheese flavour, or aroma, should not be made by a suitable mixing of the constituents when they became known.

Mr. A. G. LIPSCOMB, of A. J. Caley and Son, Ltd., presented a paper on "Dried Milk in the Chocolate Industry." He mentioned that Caley's were the first chocolate manufacturers to make and market milk chocolate in this country. This was in 1901, and he was told by one of the firm's veterans that there was no milk chocolate on the market to-day to equal that early effort. Special milk from a herd of Red Polls was used in its manufacture. The speaker proceeded to detail the methods of milk chocolate production. He said there were a number of firms who preferred to use condensed milk for making chocolate, but for convenience in production and handling, especially where a variety of chocolates were concerned, none of which amounted to much tonnage, milk powder still remained the more convenient form of introducing the milk solids into the chocolate.

Personal Notes

MR. SAMUEL MALCOLM, late of Fern Avenue, Newcastle, a retired chemical engineer, left £1,625, with net personalty £1,588.

PROFESSOR ANDREW HUNTER, M.B., is retiring from the chair of Physiological Chemistry of the University of Glasgow on September 30. Professor Hunter is returning to Toronto which he left in 1929 to succeed Professor Cathcart in the Gardiner Chair of Physiological Chemistry.

MR. R. T. PERCIVAL and Mr. J. S. Bennett have been respectively appointed lecturer and assistant lecturer in metallurgy of Sheffield University. Dr. D. C. Harrison has resigned his position as lecturer in pharmacology, on his appointment to the Chair of Biochemistry at the Queen's University of Belfast.

COLONEL WILLIAM CUTHBERT BLACKETT, formerly president of the Institution of Mining Engineers of Great Britain, died on June 14, at Durham, aged 75. He investigated many colliery explosions and received a silver medal from the Royal Humane Society for galantry in rescue work after an explosion in 1903 at Sacriston Colliery.

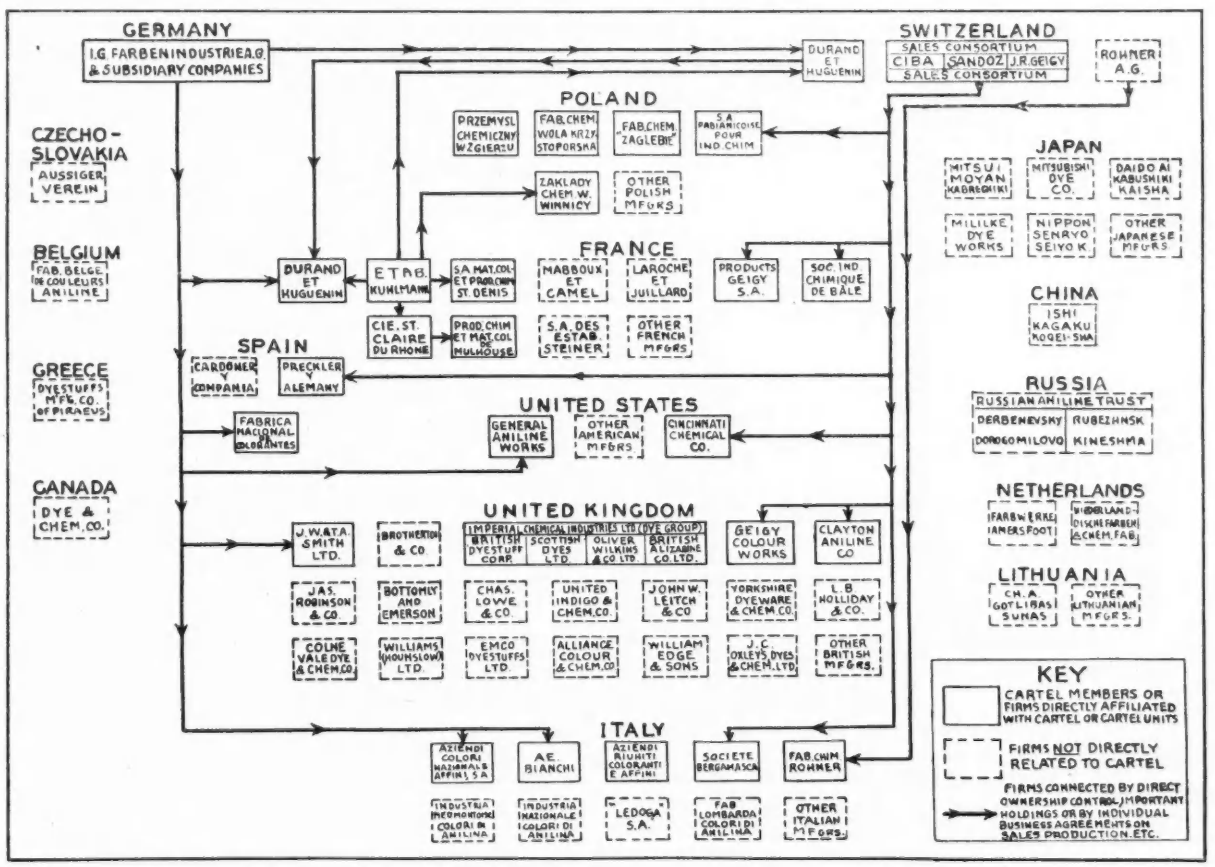
MR. H. S. GARLICK, who for the past eight years has been associated with the technical and lubricating grease manufacturing departments of the Vacuum Oil Co., Ltd., leaves Southampton in the "Georgic" on June 29 to take up an important development and research position with E. F. Houghton and Co., of Philadelphia.

MR. THOMAS ALTY, D.Sc., Ph.D., has been appointed to the Cargill Chair of Applied Physics of the University of Glasgow.

COLONEL ARTHUR C. DAVIS has been elected chairman of the London Chamber of Commerce in succession to Lord Sempill. Mr. Henry Morgan was elected deputy-chairman, and Sir Keith W. Price, treasurer. Col. Davis is managing director of Associated Portland Cement Manufacturers, Ltd., and British Portland Cement Manufacturers, Ltd., and member of Council of the Federation of British Industries.

MR. GEORGE M. WISHART, B.Sc., M.D., is to succeed Professor Andrew Hunter to the Gardiner Chair of Physiological Chemistry of the University of Glasgow. Dr. Wishart, who is 39 years of age, is at present lecturer in Physiology at Glasgow. In 1919, after serving with the Royal Air Force Medical Service, he accepted an invitation to return as an assistant to the Institute of Physiology in Glasgow University, and in the autumn of 1921 he was promoted to the Grieve Lectureship of Physiological Chemistry. He was awarded the degree of M.D. with honours in 1926, and also the Bellahouston Gold Medal. Dr. Wishart pursued his studies in Sweden and Germany, and has made numerous contributions to scientific journals. In 1931 he published a treatise on "Groundwork of Biophysics." He is external examiner in physiology, medicine, science, and dentistry at St. Andrews, and late external examiner in physiology for science at Durham.

World Production of Coal Tar Dyestuffs



THIS chart, arranged by the staff of the Chemical Division of the United States Department of Commerce, indicates the extent to which cartel participation affects the coal tar dye manufacturer in the producing countries of the world.

The Institute of Chemistry

Charter Jubilee Celebrations Next Month

THE Institute of Chemistry will celebrate its Charter Jubilee next month, the outstanding feature of the celebrations being a banquet at the Dorchester Hotel, Park Lane, London, on July 9. Invitations have already been accepted by many distinguished guests, and the company will include the Earl and Countess of Athlone, the Right Hon. Christopher Addison, Professor H. E. Armstrong, Lord Ashfield, Sir Ernest Bennett, the Bishop of Birmingham, Sir Charles V. Boys, Sir William H. Bragg, the Right Hon. Ernest Brown, Minister of Labour, Dr. E. L. Burgin, Sir John Cadman, Dr. Charles C. Carpenter, Sir Christopher Clayton, the Earl of Crawford and Balcarres, Sir Edward Crowe, Sir Henry Dale, Lord Dawson of Penn, Sir Hugh J. Elles, Sir Alfred Faulkner, Lord Gainford, Sir Richard A. Gregory, Dr. J. S. Haldane, Sir A. Daniel Hall, Sir Edward Harding, Brigadier-General Sir Harold B. Hartley, Sir Frederick Gowland Hopkins, Sir Harry Lindsay, Colonel Sir Henry Lyons, Lord Macmillan, Sir Harry McGowan, Sir W. W. McKechnie, Lord Melchett, Sir Joseph E. Petavel, Lord Plender, Sir William J. Pope, Lord Rayleigh, Sir Arthur Robinson, Lord Rutherford, Sir Isidore Salmon, Sir Herbert Samuel, Sir Russell Scott, Mr. Geoffrey H. Shakespeare, Mr. Colin Smith, Sir Frank E. Smith, Sir Findlater Stewart, Sir C. J. Howell Thomas, Lord Trent, Sir Holburt Waring, Bart., Sir David Milne Watson, Leiut.-Colonel Sir Arnold Wilson and Sir E. Hilton Young.

Past President's Reminiscences

On the following evening—Wednesday, July 10—Fellows and Associates will be afforded an opportunity of renewing acquaintances and meeting old friends at a reception, with dancing and a cabaret, at which also a large and distinguished company is expected.

Of thirty-one pre-charter members, at least ten are expected to be present at the Jubilee banquet. Those unable to attend have sent messages of regret, cordial greetings to their contemporaries and good wishes for the success of the celebration. Professor Percy F. Frankland, past-president, writing from Loch Awe, Argyllshire, to express regret that he and Mrs. Frankland are unable to accept the invitation to the banquet, says that, although unable to be present in the flesh at this important gathering, yet they will as surely be there in spirit, sharing in thought the commemorative celebration of this cardinal event in the history of the Institute.

"I am afraid," he says, "I must be one of the few still living who have been in close touch with the Institute from its inception, and I have been a witness of its growth and development from the seed planted by the founders in a soil which for a number of years appeared to be but little suited to the maintenance of a healthy and vigorous organism. The young plant germinated in a climate by no means stimulating or sympathetic and ill-winds blew on it even from quarters whence only balmy breezes of encouragement might have been anticipated.

Signal Service to the Public

"After eight years of inconspicuous vegetation, however, the founders of the Institute had, notwithstanding these adverse climatic conditions, succeeded in raising from the 'grain of mustard seed' a new species of plant—the organised profession of chemistry—possessed of sufficient vitality and promise that it could demand a place in the catalogue of the chartered associations of the country. I have a lively recollection of the meeting at Burlington House at which our then president in the felicitous and incisive phrases, of which Professor Odling was recognised as the unrivalled master amongst his contemporary colleagues, communicated the gratifying news to the assembled Fellows and Associates that the Institute had been incorporated by Royal Charter.

"With the acquisition of this Charter, the profession of chemistry became for the first time recognised as a definite and integral part of the *Kultur* of the country, and enabled the members of the Institute to rank themselves alongside of those belonging to the venerable professions of the Church, of the Law and of Medicine. The organisation of chemists as a professional body has not only been of great advantage to its members but has also been of signal service to the general public by providing the community with a chemical personnel possessing attainments certified by the Institute.

"As to the recognised value of this organisation, the most eloquent testimony is borne by the fact that the membership of the Institute, which numbered only a few hundreds in the days of its founders, has grown to as many thousands to-day. Moreover, the great advantage accruing from such a professional organisation of men of science is further attested by the recent foundation of an Institute of Physics, for which we look forward to a future development as widely beneficial both to its members and to the public as that of our Institute of Chemistry, which has so fully confirmed the wisdom and foresight of its illustrious founders more than half a century ago."

In conclusion, Professor Frankland adds that "the fortunes of the Institute have been such conspicuous milestones during the greater part of my life's course, that I could not allow the honour of the invitation to be the guest of the president and Council at the forthcoming banquet to receive from me only a formal reply."

Laboratory Glassware

British Standard Specifications

IN further development of the work which is now being carried out by a committee of the Chemical Division of the British Standards Institution in the standardisation of laboratory ware, including scientific glassware, British Standard specifications have been issued for graduated measuring cylinders, Crow receivers, Nessler cylinders and Petri dishes. These specifications include requirements governing the quality and the dimensions of the apparatus, and the committee responsible for their preparation has been working in close co-operation with the National Physical Laboratory.

The measuring cylinder specification provides for both unstoppered and stoppered graduated measuring cylinders, the specification being so framed as to provide for two classes of accuracy, A for cylinders of the highest accuracy and B for ordinary-grade cylinders possessing only commercial accuracy. Ten sizes have been provided from 5 ml. to 2,000 ml. capacity. The specification for Crow receivers similarly provides for two classes of unstoppered and stoppered Crow receivers. Three sizes of receivers, 25, 50 and 100 ml. have been standardised.

The Nessler cylinder specification provides for 50- and 100-ml. cylinders and the tolerances specified make adequate allowance for the ordinary variations in manufacture. A warning is included in the specification, however, that it is not possible to use side by side Nessler cylinders differing from each other in height of graduation mark by the maximum amount permissible under the specified tolerances. Consequently, in fulfilling any particular order, manufacturers or vendors are expected to select from their stock cylinders which agree satisfactory with each other in height of graduation mark. The following is a satisfactory manner of selection. In fulfilling an order the cylinders should be made up in batches of six, such that the height to the graduation mark for each cylinder in the batch is within the limits specified in the table given in the specification and also does not differ from the height to the graduation mark on any other cylinder in the batch by more than one millimetre. It is open to the purchaser to stipulate any other selection which would meet his requirements, but, in the absence of any such stipulation, manufacturers or vendors are to make their selection on the foregoing basis.

The Petri dish specification standardises one size of Petri dish and includes an autoclave test. The National Physical Laboratory has indicated that it is prepared to accept measuring cylinders, Crow receivers and Nessler cylinders for examination for conformity with the British Standard specifications. Copies of the specifications (Nos. 604, 605, 612 and 611—1935 respectively) may be obtained from the Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d. each, post free.

The Chemical Age Lawn Tennis Tournament

Second Round Draw

WITH the exception of one of the doubles fixtures, which has had to be postponed on account of the illness of one of the players, the first round matches in the fifth annual CHEMICAL AGE Lawn Tennis Tournament were completed last week-end. The unsettled weather had caused several delays and, in spite of every effort to ensure the fulfilment of all engagements, some matches had to be scratched. The results of the preliminary and first rounds were as follows:—

Preliminary Round

SINGLES.

A. E. Munns (Paper Goods Manufacturing Co.) walk-over, B. T. Francis (Bakelite, Ltd.), scratched.

R. F. Porter (Howards and Sons, Ltd.) defeated W. G. C. Backinsell (Le Grand Sutcliff and Gell, Ltd.), 6-1, 6-3.

A. Lewis (Stafford Allen and Sons, Ltd.) defeated P. Smith (Bakelite, Ltd.), 6-4, 2-6, 6-3.

J. I. T. Jones (The Mond Nickel Co., Ltd.) defeated J. Hudson (Bakelite, Ltd.), 6-3, 3-6, 7-5.

R. D. Hayman (Doulton and Co., Ltd.) defeated J. Window (Spencer Chapman and Messel), 6-0, 7-5.

D. G. Blow (The British Drug Houses, Ltd.) walk-over, H. H. Lusty (Bakelite, Ltd.), scratched.

L. F. Grape (Borax Consolidated, Ltd.) walk-over, F. Pritchard (Le Grand Sutcliff and Gell, Ltd.), scratched.

A. Baxter (The United Yeast Co., Ltd.) defeated V. D. Thompson (Stafford Allen and Sons), 6-0, 6-4.

A. S. Marcar (Bovril, Ltd.) defeated C. G. Copp (Doulton and Co., Ltd.), 6-4, 6-3.

First Round

SINGLES.

J. I. T. Jones (The Mond Nickel Co., Ltd.) defeated A. Lewis (Stafford Allen and Sons, Ltd.), 6-1, 3-6, 6-4.

D. G. Blow (The British Drug Houses, Ltd.) defeated R. D. Hayman (Doulton and Co. Ltd.), 6-1, 6-2.

A. S. Marcar (Bovril, Ltd.) walk-over, A. V. Rhead (Chance and Hunt, Ltd.), scratched.

W. L. Alldis (Brandhurst Co., Ltd.) walk-over, R. Stewart (Central Pulverising Co., Ltd.), scratched.

R. N. B. D. Bruce (Gas Light and Coke Co.) defeated R. A. J. Bennett (Nobel Chemical Finishes, Ltd.), 6-2, 6-3.

A. Tickner (British Celanese, Ltd.) defeated R. H. Coller (Stafford Allen and Sons, Ltd.), 6-0, 6-0.

L. J. Seabrook (The British Oxygen Co., Ltd.) defeated R. S. Law (Howards and Sons, Ltd.), 6-4, 6-4.

A. C. Collins (Sparklets, Ltd.) defeated A. E. Hughes (Limmer and Trinidad Lake Asphalt Co., Ltd.), 6-2, 8-6.

C. J. Songhurst (Bakelite, Ltd.) walk-over, C. English (S. H. Johnson and Co., Ltd.), scratched.

L. Maronge (Bakelite, Ltd.) walk-over, P. E. Dearman (British Oxygen Co., Ltd.), scratched.

F. G. Hawley (Anglo-Persian Oil Co.) defeated H. R. Whittaker (Williams (Hounslow), Ltd.), 9-7, 6-2.

J. Haines (Anglo-Persian Oil Co., Ltd.) defeated R. J. Sleap (United Yeast Co., Ltd.), 6-0, 6-3.

J. S. Wilson (British Celanese, Ltd.) defeated E. P. Lewis (Stafford Allen and Sons), 6-1, 6-3.

G. E. Verney (The Pyrene Co., Ltd.) walk-over, W. A. Robbins (Le Grand Sutcliff and Gell), scratched.

DOUBLES.

J. Haines and F. G. Hawley (Anglo-Persian Oil Co., Ltd.) walk-over, P. E. Dearman and L. J. Seabrook (British Oxygen Co.), scratched.

R. Tinkler and A. E. Triggs (Murex Welding Processes, Ltd.) defeated C. English and L. Woodforde (S. H. Johnson and Co., Ltd.), 6-3, 4-6, 8-6.

R. N. B. D. Bruce and E. H. M. Badger (Gas Light and Coke Co.) defeated W. G. C. Backinsell and F. Pritchard (Le Grand Sutcliff and Gell, Ltd.), 6-1, 6-2.

H. A. Steel and F. G. Crosse (Society of Chemical Industry) defeated J. A. Shaw and G. Stanford (Johnson Matthey and Co., Ltd.), 6-3, 8-6.

F. C. White and A. W. White (Howards and Sons, Ltd.) walk-over, H. H. Lusty and C. J. Songhurst (Bakelite, Ltd.), scratched.

C. G. Copp and R. D. Hayman (Doulton and Co., Ltd.) defeated A. Lewis and V. D. Thompson (Stafford Allen and Sons, Ltd.), 6-0, 3-6, 6-1.

F. R. O. Allen and R. A. J. Bennett (Nobel Chemical Finishes, Ltd.) defeated B. T. Francis and P. Smith (Bakelite, Ltd.), 6-2, 6-4.

The draw was made on Monday for the second round, full particulars of which are as follows:

Second Round Draw

Singles

Grape, L. F. Borax Consolidated Ltd., Regis House, King William Street, London, E.C.4. (Mansion House 8332.)	*v*	**Jones, J. I. T.** The Mond Nickel Co., Ltd., Thames House, Millbank, London, S.W.1. (Victoria 5353, Ext. 8.)
Munns, A. E. Paper Goods Manufacturing Co., Westmead Road, Sutton, Surrey. (Sutton 3562.)	*v*	**Verney, G. E.** The Pyrene Co., Ltd., Great West Road, Brentford. (Ealing 3444.)
Blow, D. G. The British Drug Houses, Ltd., 16-30, Graham Street, City Road, London, N.1. (Clerkenwell 3000, Ext. 23.)	*v*	**Wilson, J. S.** British Celanese, Ltd., 22/23, Hanover Square, London, W.1. (Mayfair 8000, Ext. 137.)
Marcar, A. S. Bovril, Ltd., 148-166, Old Street, London, E.C. (Clerkenwell 1202.)	*v*	**Haines, J.** Anglo-Persian Oil Co., Ltd., Britannic House, Finsbury Circus, London. (National 1212.)
Alldis, W. L. Brandhurst Co., Ltd., Vintry House, Queen Street Place, London, E.C.4. (Central 1411.)	*v*	**Hawley, F. G.** Anglo-Persian Oil Co., Britannic House, Finsbury Circus, London. (National 1212.)
Bruce, R. N. B. D Gas Light and Coke Co., No. 1 Laboratory, Fulham, London, S.W.6. (Fulham 5531, Ext. 10.)	*v*	**Maronge, L.** Bakelite, Ltd., 68, Victoria Street, London, S.W.1. (Victoria 5441.)
Seabrook, L. J. The British Oxygen Co., Ltd., Angel Road, Edmonton, London, N.18. (Tottenham 2488.)	*v*	**Tickner, A.** British Celanese, Ltd., 22-23, Hanover Square, London, W.1. (Mayfair 8000, Ext. 137.)
Collins, A .C. Sparklets, Ltd., Angel Road, Upper Edmonton, London, N.18. (Tottenham 2647.)	*v*	**Songhurst, C. J.** Bakelite, Ltd., 68, Victoria Street, London, S.W.1. (Victoria 5441.)

Doubles

Blow, D. G., & Cripps, V. G. The British Drug Houses, Ltd. 16/30, Graham Street, City Road London, N.1. (Clerkenwell 3000.)	*v*	**Willshere, A. E., & Grape, L. F.** Borax Consolidated, Ltd., Regis House, King William Street, London, E.C.4. (Mansion House 8332.) or **Wilson, J. S., & Tickner, A.** British Celanese, Ltd., 22/3, Hanover Square, London, W.1. (Mayfair 8000, Ext. 137.)
Sibley, H. A. C., & Collins, A. C. The British Oxygen Co., Ltd., Angel Road, Upper Edmonton, London, N.18. (Tottenham 2488.)	*v*	**Allen, F. R. O., & Bennett, R. A. J.** Nobel Chemical Finishes, Ltd., Wexham Road, Slough, Bucks. (Slough 528, Ext. 210.)
Bruce, R. N. B. D., & Badger, E. H. M. Gas Light and Coke Co., No. 1 Laboratory, Kings Road, Fulham, S.W.6. (Fulham 5531, Ext. 10.)	*v*	**George, R., & Pennington, R. C.** J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)
Maronge, L., & Hudson, J. Bakelite, Ltd., 68, Victoria Street, London, S.W.1. (Victoria 5441.)	*v*	**Copp, C. G., & Hayman, R. D.** Doulton & Co., Ltd., Lambeth, London, S.E.1. (Reliance 1241.)
Prosser, V. J., & Baxter, A. John Haig & Co., Ltd., 2, Pall Mall East, London, S.W.1. (Whitehall 1040.)	*v*	**White, F. C., & White, A. W.** Howards & Sons, Ltd., Ilford, Essex. (Ilford 1113.)
Harbour, S., & Webb, A. J. Williams (Hounslow), Ltd., Hounslow, Middx. (Hounslow 1166).	*v*	**Steel, H. A., & Crosse, F. G.** Society of Chemical Industry, Central House, Finsbury Square, London, E.C.2. (Met. 3773.)
Almond, E. G., & Barnett, G. Bakelite, Ltd., Redfern Road, Tyseley, Birmingham. (Acocks Green 1181.)	*v*	**Tinkler, R., & Triggs, A. E.** Murex Welding Processes, Ltd., Ferry Lane Works, Forest Road, London, E.17. (Larkswood 2284.)
Porter, R. F., & Law, R. S. Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Ilford 1113.)	*v*	**Haines, J., & Hawley, F. G.** Anglo-Persian Oil Co., Ltd., Britannic House, Finsbury Circus, London. (National 1212.)

The second round must be completed by Monday, July 8, and the results of all matches sent to the Editor, THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, E.C.4, so as to arrive not later than first post on Tuesday, July 9.

British Overseas Chemical Trade in May

Previous Month's Figures Maintained

THE Board of Trade returns for the month ended May 31 show that exports of chemicals, drugs, dyes and colours were valued at £1,796,621 as compared with £1,809,615 for May, 1934, a decrease of £12,994. Imports were valued at £928,335, as compared with £973,906, a decrease of £45,571; re-exports were valued at £57,475.

Imports

	Quantities. May 31. 1934.	Quantities. May 31. 1935.	Value. May 31. 1934. £	Value. May 31. 1935. £
Acids—				
Acetic .. .. cwt.	16,551	14,662	27,564	21,437
Boric (boracic) .. ,,	3,207	4,620	3,197	4,584
Citric .. .. ,,	1,290	1,255	3,705	5,102
Tartaric .. .. ,,	4,982	3,552	20,759	14,948
All other sorts .. value	—	—	8,488	7,504
Borax .. .. cwt.	14,536	14,603	7,813	7,302
Calcium carbide .. ,,	70,335	92,019	41,645	47,467
Phosphorus	2,527	1,122	7,779	3,165
Potassium compounds—				
Caustic and lyes cwt.	10,818	10,346	13,613	12,820
Chloride (muriate) ,,	22,863	21,412	10,302	6,373
Kainite and other mineral fertiliser salts cwt.	33,879	50,801	6,202	7,205
Nitrate (saltpetre) ,,	8,817	9,410	8,760	5,738
Sulphate .. .. ,,	5,410	40,868	2,756	14,377
All other compounds ,,	9,284	10,815	16,098	16,471
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	11,728	6,450	3,715	2,123
Chromate and bichromate .. .. cwt.	3,890	6,346	5,642	8,405
Cyanide .. .. ,,	2,220	4,358	5,240	11,929
Nitrate .. .. ,,	32,947	66,186	6,725	14,059
All other compounds ,,	14,330	19,630	15,555	15,236
Other chemical manufactures .. .. value	—	—	233,359	248,716
Drugs, medicines, etc.—				
Quinine and quinine salts .. oz.	61,363	134,840	5,496	10,816
Medicinal oils .. cwt.	2,774	2,431	6,010	6,842
Ointments and liniments cwt.	7	5	336	300
Proprietary medicines value	—	—	44,519	46,151
All other sorts .. ,,	—	—	52,512	34,810
Bark Cinchona (bark Peruvian, etc.) cwt.	747	1,262	3,337	7,536
Other raw or simply prepared .. value	—	—	31,430	42,263
Finished dyestuffs (coal tar) .. .. cwt.	4,732	3,935	128,920	102,021
Extracts for dyeing cwt.	7,480	5,020	15,153	9,718
Extracts for tanning—				
Chestnut .. cwt.	30,061	28,840	20,329	19,355
Quebracho .. ,,	44,066	17,571	26,407	10,080
All other sorts .. ,,	49,127	28,853	36,268	20,399
All other dyes and dyestuffs .. .. cwt.	361	911	4,083	19,640
Painters' colours and materials—				
White lead (basic carbonate) .. cwt.	7,394	11,033	8,479	13,146
Lithopone .. ,,	29,358	22,242	19,246	14,320
Ochres and earth colours cwt.	28,977	29,114	10,124	10,718
Bronze powders ,,	1,614	1,973	11,453	13,268
Carbon blacks .. ,,	34,956	23,425	51,959	37,729
Other pigments and extenders, dry .. cwt.	24,696	20,552	8,937	6,371
All other descriptions ,,	18,399	14,490	39,991	27,891
Total .. .. value	—	—	973,906	928,335

Exports

	Quantities. May 31. 1934.	Quantities. May 31. 1935.	Value. May 31. 1934. £	Value. May 31. 1935. £
Acids—				
Citric .. .. cwt.	4,076	2,257	13,643	9,030
All other sorts .. value	—	—	23,977	24,754
Aluminium compounds tons	6,114	8,850	64,965	100,835
Ammonium compounds—				
Sulphate .. tons	33,045	18,905	194,021	111,152
All other sorts .. ,,	1,068	1,276	15,135	15,925
Bleaching powder (chloride of lime) .. .. cwt.	40,017	28,670	10,484	10,947
Coal tar products—				
Cresylic acid .. gal.	163,317	156,336	14,066	13,608
Tar oil, creosote oil, etc. gal.	1,110,227	1,335,693	18,485	37,065
All other sorts .. value	—	—	14,847	18,250
Copper, sulphate of tons	5,188	4,865	72,127	65,923
Disinfectants, insecticides, etc. .. .. cwt.	34,518	36,625	75,691	71,315
Glycerine .. .. ,,	16,444	8,357	34,508	21,534
Lead compounds .. ,,	15,929	17,864	19,158	19,619
Magnesium compounds tons	464	550	11,622	12,588
Potassium compounds cwt.	4,179	14,008	11,695	15,310
Salt (sodium chloride) tons	21,968	23,854	53,315	52,997
Sodium compounds—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	382,035	335,139	96,476	82,221
Caustic .. .. ,,	158,981	187,284	103,572	96,387
Nitrate .. .. ,,	15,740	11,783	5,587	4,240
Sulphate, including salt-cake .. .. cwt.	38,334	79,250	3,771	7,009
All other sorts .. ,,	75,131	76,005	95,750	96,031
Zinc oxide .. .. tons	951	1,014	18,770	18,802
All other descriptions value	—	—	206,092	233,459
Drugs, medicines, etc.—				
Quinine and quinine salts .. .. oz.	101,150	145,401	11,281	15,286
Proprietary medicines value	—	—	105,058	93,754
All other descriptions ,,	—	—	140,792	140,878
Dyes and dyestuffs—				
Alizarine, alizarine red and indigo (synthetic) cwt.	3,290	1,930	18,769	11,444
Other finished dyestuffs (coal tar) .. cwt.	5,790	6,977	70,152	92,548
All other descriptions ,,	22,011	25,139	28,151	29,729
Painters' colours and materials—				
Ochres and earth colours cwt.	16,722	20,987	15,530	16,414
Other pigments and extenders, dry .. cwt.	29,676	24,333	29,305	32,235
White lead .. ,,	5,759	6,687	10,849	12,547
Paints and painters' enamels, prepared cwt.	44,146	41,578	112,023	111,715
Varnish and lacquer gal.	83,719	93,314	33,492	33,761
All other descriptions cwt.	26,527	33,980	55,856	67,309
Total .. .. value	—	—	1,809,615	1,796,621

Re-Exports

	Value. May 31. 1934. £	Value. May 31. 1935. £
Chemical manufactures and products .. value	15,804	17,785
Drugs, medicines and medicinal preparations —		
Manufactured or prepared .. .. value	21,187	13,630
Raw or simply prepared value	7,258	23,561
Dyes and dyestuffs and extracts for dyeing and tanning .. .. cwt.	752	1,463
Painters' colours and materials .. .. cwt.	488	1,036
Total .. .. value	45,489	57,475

I.C.I. Capital Scheme

Court Application to Fix Hearing

A PETITION for the sanction of the Court to the proposed reduction of the capital of Imperial Chemical Industries, Ltd., was mentioned before Mr. Justice Eve in the Chancery Division, on June 18.

Mr. Lionel Cohen, K.C., for the company, said the petition would normally be before the Court on Monday, June 24, but it could not be conveniently dealt with then. It was opposed, and would take two or three days. He asked his lordship to fix July 17 for the hearing. They had not yet received the evidence in opposition.

Mr. Wallington, K.C., for opposing shareholders, said it would be impossible to get the evidence ready by then. He would have to communicate with 85,000 shareholders, and his lordship ought to be asked to make an order for discovery of relevant documents. Questions would arise as to the validity of the meetings and as to the way in which the scheme had been launched. While no one suggested, or even thought there was a want of good faith anywhere, yet the position of the directors would have to be inquired into.

Mr. Cohen said the shareholders were supplied with full information on April 6, and the deferred shareholders had appointed a committee. The holdings of directors had been disclosed to them.

Mr. Justice Eve said the petition must be effective this term.

Mr. Cohen said the effect of the scheme was to merge the ordinary and deferred shares into one class and if the case went over the vacation they would be getting very near the date for the distribution of the interim dividend and difficulties would arise.

Mr. Justice Eve said that if the petitioners would leave their evidence with him he would read it and the present application could be renewed that day week. He would then ask Mr. Wallington to state what he considered a fair and reasonable time in which to answer the evidence.

Paint—Past, Present and Future

Dr. W. Krumbhaar Addresses the Paint Industry

HOW "kettles" containing 4,000 gal. are now used with safety in varnish factories for bodying oils was mentioned by Dr. Wm. Krumbhaar, the well-known international paint chemist, in a talk on "The Romance of the Paint Trade," at a recent meeting arranged by the Paint Industries Club, of more than 130 representatives of every section of the paint industry at the British Industries House Club, London. Many dangerous moments had to be passed, said Dr. Krumbhaar, before the large kettles which are used for the melting of 5,000-lb. batches of resins for varnish making, or more, could be made safe. Previously, the customary batch was only one-hundredth of this amount.

Reviewing the development of the paint industry in the past, present and future, Dr. Krumbhaar discussed the psychological effect of different colours. "Can the future actually bring forth a paint which will have a beneficial influence on temperament and mental efficiency in human beings?" he asked. "When we read of the scientific investigations which are being carried on to find the influence of different colours on mental activity, it does not seem such an extremely remote possibility that paints will be developed which will actually be helpful to intellectual work."

Dr. Krumbhaar, referring to his intimate relations with both British and American paint industries, revealed that he had often heard the American's view of the Englishman, and vice versa. The average American thinks England old-fashioned, slow and somewhat behind the times, but he envies his British cousins their attitude to the ups and downs of business life. He also envies the Englishman his powers of diplomacy in business, especially his ability to agree upon compromise.

The British business man, of course, continued Dr. Krumbhaar, is proud of his country as a land of tradition, and, with a sidelong glance at his American cousins, of the manner and mode in which he has lived down the depression. On the other hand, Englishmen will readily concede to the Americans that America is a land of progress, that many inventions are neglected in England which have been successfully exploited in the United States. They did not, however, feel that the Americans had always shown the safe road to such achievements.

Other developments which Dr. Krumbhaar foreshadowed in the future were the evolution of a practical and permanently luminous paint for night traffic signs, and the drying of lacquers by extreme cold instead of extreme heat. Dr. Krumbhaar stated that he believed that there is more romanticism in the paint trade than in many other lines of business. The total value of the paints and varnishes produced in the United States alone is 300,000,000 dollars annually.

United States Patents Action

Chaney Activated Carbon Patents Infringed

IN a decision rendered by the United States District Court for the District of Connecticut, May 13, the Chaney Patents, Nos. 1,497,543 and 1,497,544, covering activated vapour adsorbent carbon, were held valid and infringed. The suit was brought by National Carbon Co., Inc., a unit of the Union Carbide and Carbon Corporation, against Richards and Co., Inc., and the Zapon Co., of Stamford, Conn., because the two latter companies were using for solvent recovery activated coconut carbon which had been made by the Barnebey-Cheney Engineering Co., of Columbus, Ohio.

District Judge Hincks held that this constituted infringement of the plaintiffs' patents, the claims of which he found valid. He rendered judgment in favour of the plaintiff for $24,410.65 on account of the infringement.

The Chaney patents were based on the wartime discoveries of Dr. N. K. Chaney and his associates in the National Carbon Co., Inc.—discoveries that assured an ample supply of efficient gas-mask carbon at a time when the need was urgent. After the war, it was found that this highly activated carbon was equally efficient for a variety of peace time uses. In 1919, the National Carbon Co., Inc., began the manufacture of activated carbons by the Chaney process for industrial use. Marketing of these products is handled by Carbide and Carbon Chemicals Corporation, also a unit of the Union Carbide and Carbon Corporation, which furnishes equipment and technical service in solvent recovery and gas purification.

Royal Society of Arts

Prizes for Teachers' Essays

LAST autumn the council of the Royal Society of Arts offered to art teachers the following prizes for an essay on "Training Art Students for Industry and Commerce": First prize, £50 and a life fellowship of the Royal Society of Arts. (It is proposed to ask the local education authority under which the successful candidate serves to supplement the prize by awarding a grant for the purposes of an educational tour on the Continent.) Second prize, £10; third prize, £5. The object was to encourage art teachers to train their students in such a way as to fit them to take their places as designers or craftsmen in industry, and thus fulfil the principal object for which the schools of art were established.

In response to this offer 131 essays were received. The large number and the excellence of many of them rendered the task of judging the work considerably longer and more difficult than was at first expected, but the judges have now completed their work and have made the following awards: First prize, Francis A. Taylor, L.C.C. School of Art, Hackney Technical Institute; second prize, Alfred H. Rodway, School of Arts and Crafts, Keighley; third prizes, Stanley Murray Scott, Sunderland, and G. A. Stevens, Eastbourne College; highly commended, W. T. Blackband, Birmingham, H. Vincent Clark, Bradford, Miss Mabel A. E. Crompton, Mytholmroyd, W. Yorks, and Sidney Gibbon, Newark-on-Trent.

The four prize-winning essays will be printed in the "Journal" of the Royal Society of Arts during the summer recess. The judges appointed by the council of the Society were: Mr. C. Geoffrey Holme, Mr. Tom Purvis and Mr. Harold W. Sanderson, representing the council of the Royal Society of Arts; Mr. R. Radcliffe Carter, secretary, National Society of Art Masters; Mr. Charles Tennyson, chairman, Industrial Art Committee, Federation of British Industries; and Mr. Reginald R. Tomlinson, Senior Inspector of Art, London County Council.

News from the Allied Industries

Cement

NEGOTIATIONS FOR THE PROJECTED FORMATION of a central propaganda organisation for the cement industry are nearing completion. It is understood that an annual subscription related to output will be paid into a common fund by all members adhering to the cement agreement. This agreement embraces practically all the cement manufacturers of Great Britain and Northern Ireland.

Iron and Steel

THERE WERE NINETY-SEVEN FURNACES in blast at the end of May, three furnaces having been blown out and four put into operation during the month. The production of pig-iron in May amounted to 558,900 tons, compared with 526,300 tons in April, and 527,900 tons in May, 1934. The daily rate advanced to 18,029 tons in May from 17,543 tons in April. The month's production includes 113,800 tons of hematite, 317,200 tons of basic, 105,400 tons of foundry, and 8,200 tons of forge pig-iron. The output of steel ingots and castings amounted to 853,300 tons in May, compared with 808,700 tons in April and 780,000 tons in May, 1934.

IMPORTANT EXTENSIONS TO THE EQUIPMENT of the Cargo Fleet Iron Co.'s works have been decided upon. It is understood that the company is to put down a modern semi-continuous billet and sheet-bar mill which will compare favourably with the most up-to-date plant of this character in the country. The contract has been placed with a Dusseldorf firm who are specialists in this type of plant, but the extensive electrical equipment will be supplied by a British firm. It is anticipated that the erection of the new plant will occupy nearly twelve months. In recent years heavy tonnages of semi-finished steel have been imported to the River Tees by local firms for re-rolling purposes, and last year over 40,000 tons were discharged at Tees ports. The cost of the new plant is believed to exceed £100,000.

China Clay

THE RESULT OF THE STRENUOUS EFFORTS made for the resuscitation of the China Clay Association is very disappointing to the majority of the producers, who realise that their only chance or hope of success lay in a general agreement and by co-operation. Though the china stone producers have no opposition in any other country and china stone is only quarried in the St. Dennis and St. Stephens districts in the rural district of St. Austell, there has been a china stone association functioning for many years to the advantage of those engaged in the industry. As far back as 1860 an arrangement was made to divide the orders of china stone between the quarries at St. Dennis and St. Stephens by means of arbitration, in which the late Mr. R. G. Lakes was the arbitrator. This arrangement lasted for several years until it was broken up by some action on the part of the lords of the lands concerned. In the absence of an association the china clay producers have only one channel to secure better prices and that is in a much greater demand, which may still be a long way off.

Continental Chemical Notes

Hungary

INVERT SUGAR FOR INJECTION PURPOSES is now made by the Certa Pharmaceutical Co., of Budapest.

Sweden

THE SULPHITE CELLULOSE FACTORY at Skutskär, owned by the Stora Kopparbergs A.B., is to be doubled in capacity to permit of an annual output of 50,000 tons.

Poland

THE TOMASZOW RAYON CO. made a profit of nearly five million zloty in 1934, and increased its turnover by 35 per cent., the plant working to full capacity throughout the year.

MANUFACTURE OF CHEMICALS FOR ROAD DRESSINGS is contemplated by Fabriky i Zaklady Chemniczno-Przemyslowe Pemi, of Warsaw (capital 100,000 zloty).

France

A NEW PETROLEUM REFINERY with a daily capacity of 600 tons crude oil has been started up by the Raffinerie Pechelbronn-Ouest at Donges.

THE SAINT-GOBAIN CONCERN reports that the new ammonia and ammonium nitrate plants at Rouen are now in production. A liquid chlorine plant is under construction at Saint-Fons, while another new development of the compay's activities is the production of concentrated superphosphates.

Russia

A COBALT ORE DRESSING PLANT, with a daily capacity of 50 tons, is planned in connection with exploitation of the Azerbaijan deposits. Cobalt ores have also been discovered in the Bogoslovskoje mining area where a dressing plant is likewise projected.

THE UKRAINE CEREAL INSTITUTE has elaborated a process for producing sugar, alcohol, fodder yeast and other products from straw. Trials on the factory scale are now proceeding. Even if only applied to 5 per cent. of the annually available straw, the estimated annual outputs would be 350,000 tons fodder sugar, 1.1 million tons fodder yeast and 70 million decalitres alcohol.

Holland

AN EXTENSIVE ASPHALT PLANT is to be erected on a site close to the new petroleum wharves at Rotterdam by the Bataafsche Petroleum My.

Austria

ESSENTIAL OILS, food dyes and food essences are now being made by the firm of Zander and Gohl, of Vienna. The firm of Aujesky and Weiss, paint manufacturers, Vienna, have started the manufacture of floor and motor car polishes.

Czechoslovakia

ACCORDING TO A PRAGUE REPORT, the Ossig Chemical Union is to embark upon the manufacture of photographic films, plates and papers.

A CARTEL HAS BEEN REGISTERED to control production and marketing of sulphuric acid, aluminium hydrate, aluminium sulphate and other aluminium salts. Participants in the cartel are the Fosfa Co., of Prague, and Zschimmer and Schwarz Chemical Works, of Gruenberg.

Germany

THE FELDMUHLE PAPER AND PULP CO., of Stettin, is extending its corondum furnaces at Lülsdorf, and is also installing a fresh series of abrasive wheel kilns at the Wesseling works.

PYRITES PRODUCTION from the Meggen deposits continued to expand in 1934, states the annual report of Sachtleben A.-G., the output being 15 per cent. and 22 per cent. greater than in 1933 and 1932 respectively. About 86 per cent. of German requirements are now covered by home resources, but importation of pyrites still continues on an extensive scale owing to the exceptionally low prices of foreign pyrites.

A LARGE BITUMINOUS COAL HYDROGENATION PLANT is under construction at Scholven in the Ruhr, and is to be operated by the I. G. Farbenindustrie's process. The plant will produce 125,000 tons of benzine per year. Another important hydrogenation development is being fostered by the Victor Mining Co., of Rauxel, under licence from Ruhrchemie A.-G., two units each with an annual capacity of 1,000 tons having reached the production stage.

Chemical and Allied Stocks and Shares

Current Quotations

THE following table shows this week's Stock Exchange quotations of chemical and allied stocks and shares compared with those of last week. Except where otherwise shown the shares are of £1 denomination.

Name	June 18.	June 11.
Anglo-Persian Oil Co., Ltd. Ord.	61/10½	62/6
,, 8% Cum. Pref.	37/6	37/3
,, 9% Cum. Pref.	38/6	38/-
Associated Dyers and Cleaners, Ltd. Ord.	1/10½	1/10½
,, 6½% Cum. Pref.	4/8¼	4/8¼
Associated Portland Cement Manufacturers, Ltd. Ord.	54/-	51/6
,, 5½% Cum. Pref.	27/3	27/9
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	60/7½	60/-
Bleachers' Association, Ltd. Ord.	6/3	5/6
,, 5½% Cum. Pref.	8/9	7/6
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	21/3	21/3
Boots Pure Drug Co., Ltd. Ord. (5/-)	49/3	49/3
Borax Consolidated, Ltd. Pfd. Ord. (£)	97/6	97/6
,, Defd. Ord.	15/9	16/-
,, 5½% Cum. Pref. (£10)	225/-	225/-
,, 4½% Deb. (1st Mort.) Red. (£100)	£109	£109
,, 4½% 2nd Mort. Deb. Red. (£100)	£103	£103
Bradford Dyers' Association, Ltd. Ord.	8/9	8/9
,, 5% Cum. Pref.	10/11¼	10/11¼
,, 4% 1st Mort. Perp. Deb. (£100)	£82/10/-	£82/10/-
British Celanese, Ltd. 7% 1st Cum. Pref.	26/6	27/-
,, 7½% Part. 2nd Cum. Pref.	21/9	22/6
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/-	5/-
,, 4% 1st Mort. Deb. Red. (£100)	£91	£91
British Cyanides Co., Ltd. Ord. (2/-)	2/10½	2/10½
British Drug Houses, Ltd. Ord.	18/9	18/9
,, 5% Cum. Pref.	22/6	22/6
British Glues and Chemicals, Ltd. Ord. (4/-)	4/3	4/3
,, 8% Pref. (Cum. and Part.)	26/10½	26/10½
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/1½	48/1½
,, 5½% Cum. Pref.	26/3	26/3
,, 4½% First Mort. Deb. Red. (£100)	£108/10/-	£108/10/-
British Oxygen Co. Ltd. Ord.	107/6	98/1½
,, 6½% Cum. Pref.	31/10½	31/10½
British Portland Cement Manufacturers, Ltd. Ord.	88/9	87/6
,, 6% Cum. Pref.	30/-	29/6
Bryant & May, Ltd. Pref.	67/6	67/6
Burt, Boulton & Haywood, Ltd. Ord.	20/-	20/-
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£105/10/-	£105/10/-
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	105/-	105/-
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/-
Calico Printers' Association, Ltd. Ord.	9/4½	15/7½
,, 5% Pref. (Cum.)	16/10½	16/10½
Cellulose Acetate Silk Co., Ltd. Ord.	12/6	13/6
,, Deferred (1/-)	2/7½	2/10½
Consett Iron Co., Ltd. Ord.	7/3	6/-
,, 8% Pref.	23/1½	20/-
,, 6% First Deb. stock, Red. (£100)	£102	£101/10/-
Cooper, McDougall & Robertson, Ltd. Ord.	36/3	36/3
,, 7% Cum. Pref.	29/6	29/-
Courtaulds, Ltd. Ord.	58/9	59/-
,, 5% Cum.	26/3	26/3
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	28/9	28/9
,, 7½% "A" Cum. Pref.	30/7½	30/7½
Distillers Co., Ltd. Ord.	95/6	95/-
,, 6% Pref. Stock Cum.	32/-	32/-
Dorman Long & Co., Ltd. Ord.	17/6	16/3
,, Prefd. Ord.	15/7½	14/4½
,, 6½% Non-Cum. 1st Pref.	20/6	20/-
,, 8% Non-Cum. 2nd Pref.	16/10½	15/-
,, 4% First Mort. Perp. Deb. (£100)	£101/10/-	£101/10/-
,, 5% 1st Mort. Red. Deb. (£100)	£103	£102

Name	June 18.	June 11.
English Velvet & Cord Dyers' Association, Ltd. Ord.	4/4½	4/4½
,, 5% Cum. Pref.	8/1½	7/6
,, 4% First Mort. Deb. Red. (£100)	£65	£70
Fison, Packard & Prentice, Ltd. Ord.	38/9	38/9
,, 7% Non-Cum. Pref.	30/-	30/-
,, 4½% Debs. (Reg.) Red. (£100)	£107	£107
Gas Light & Coke Co. Ord.	28/-	27/9
,, 3½% Maximum Stock (£100)	£87/10/-	£87/10/-
,, 4% Consolidated Pref. Stock (£100)	£108/10/-	£106/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£89/10/-	£90/10/-
,, 5% Deb. Stock, Red. (£100)	£115/10/-	£115/10/-
,, 4½% Red. Deb. Stock (1960-65) (£100)	£111/10/	£111/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	12/6	12/6
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	27/6	27/6
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	28/9	28/9
Imperial Chemical Industries, Ltd. Ord.	37/-	37/-
,, Deferred (10/-)	9/1½	9/-
,, 7% Cum. Pref.	34/-	34/3
Imperial Smelting Corporation, Ltd. Ord.	15/-	15/-
,, 6½% Pref. (Cum.)	24/4½	24/4½
International Nickel Co. of Canada, Ltd. Cum.	$28	$29
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	95/-	95/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	107/6	107/6
Lawes Chemical Manure Co., Ltd. Ord. (1/-)	5/7½	5/7½
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros., Ltd. 7% Cum. Pref.	32/3	32/3
,, 8% Cum. "A" Pref.	32/9	32/9
,, 20% Cum. Prefd. Ord.	79/4½	79/4½
,, 5% Cons. Deb. (£100)	£109/10/-	£109/10/-
,, 4% Cons. Deb. (£100)	£105	£105
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	58/-	58/-
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/6¾
Mond Nickel Co., Ltd. 5½% Mort. Deb. Red. (£100)	£103	£103
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	44/-	43/-
,, 7% Cum. Pref.	33/1½	33/1½
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	67/-	64/6
Reckitt & Sons, Ltd. Ord.	113/1½	112/6
,, 4½% Cum. 1st Pref.	25/-	25/-
Salt Union, Ltd. Ord.	41/3	41/3
,, Pref.	46/3	46/3
,, 4½ Deb. (£100)	£109/10/-	£109/10/-
South Metropolitan Gas Co. Ord. (£100)	£129/10/-	£130/10/-
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£106/10/-	£106/10/-
,, Perpetual 3% Deb. (£100)	£89/10/-	£89/10/-
,, 5% Red. Deb. 1950-60 (£100)	£115/10/-	£115/10/-
Staveley Coal & Iron Co., Ltd. Ord.	44/4½	43/9
Stevenson & Howell, Ltd., 6½% Cum. Pref.	26/3	26/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	70/-	71/3
Unilever, Ltd. Ord.	30/7½	30/7½
,, 7% Cum. Pref.	29/9	29/9
United Glass Bottle Manufacturers, Ltd. Ord.	42/6	41/-
,, 7½% Cum. Pref.	33/-	33/-
United Molasses Co., Ltd. Ord. (6/8)	20/7½	20/7½
,, 6% Cum. Pref.	25/-	25/-
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	6/3	5/-
,, 7% Cum. Pref.	23/9	23/9
,, 6% Deb. Red. (£100)	£102	£102

Weekly Prices of British Chemical Products

Review of Current Market Conditions

PRICES of general heavy chemicals, rubber chemicals, wood distillation products, perfumery chemicals and intermediates have remained unchanged from last week. In the coal tar products section there have been slight reductions in pitch and pyridine, while there have been variations in a number of essential oils. Unless otherwise stated the price below cover fair quantities net and naked at sellers' works.

LONDON.—The London chemical market for practically all products continues firm with quite a satisfactory volume of inquiry. Prices continue steady and there are no changes to report. The market prices for coal tar products are unchanged from last week. Pitch is quoted at about 37s. 6d. to 40s. per ton, f.o.b. East Coast port.

MANCHESTER.—The chemical markets in the Manchester area have opened on a reasonably cheerful note after the holidays and on the Manchester Royal Exchange this week most sellers were able to report a satisfactory resumption of deliveries against contracts after the interruptions last week. At the moment of writing, there has been no marked improvement in the weight of new contract business placed and new buying generally just now is on a moderate scale, with a sprinkling of forward commitments to replace those that are approaching the expiry stage. Values in most directions continue very steady. This, for the most part, is also the case with the by-products, with pitch the outstanding exception. The light materials are in moderate demand, whilst fair activity is again reported in respect of carbolic acid and creosote oil.

SCOTLAND.—Charles Tennant and Co., Ltd., report that business for the past week has been exceedingly quiet. Bryce and Rumpff state that there has been a steady day-to-day demand for chemicals for home trade during the week, but export business still remains quiet. Prices generally continue firm with only slight changes to report.

Price Changes

Coal Tar Products.—PITCH, medium, soft, 37s. 6d. per ton; PYRIDINE, 90/140, 5s. 6d. to 8s. 6d. per gal.

Pharmaceutical and Photographic Chemicals.—QUININE SULPHATE, P.B., 2s. 1d. per oz.

Essential Oils.—BERGAMOT, 6s. 6d. per lb.; BOURBON GERANIUM, 22s. per lb.; CANANGA, JAVA, 14s. per lb.; CASSIA, 80/85%, 6s. 6d. per lb.; LEMON, 7s. 3d. per lb.; PEPPERMINT, JAPANESE, 4s. 4d. per lb.; PETITGRAIN, 5s. 6d. per lb.

All other prices remain unchanged.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. SCOTLAND: Crystals £26 10s.; powder, £27 10s.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. less 5%. MANCHESTER: 11¾d.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. 0½d. to 1s. 0¾d. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE. SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £34 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £16 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal. £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £23, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORINE.—£11 per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £6 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 to £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—3s. 4d. to 3s. 8d per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¼d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10½d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3¼d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £4 2s. less 2½%.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £25 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34 10s.; brown, £32.

LEAD NITRATE.—£27 10s. per ton.

LEAD, RED.—SCOTLAND: £24 to £26 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £36 10s.

LITHOPONE.—30%, £17 to £17 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—7¾d. to 8½d. per lb. to June 30; 6¾d. to 7½d. from July 1 to December 31.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38 to £41.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5% d/d U.K. Discount according to quantity. Ground, 5½d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38 10s.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.
POTASSIUM NIRATE.—SCOTLAND. Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.
POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10¼d. MANCHESTER: B.P., 11¾d.
POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¼d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d.
SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.
SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r in bags.
SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£22 per ton. LONDON: £22. SCOTLAND: £20.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lot less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 10s. per ton. SCOTLAND: 3⅞d. per lb.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.
SODIUM META SILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5¼d. per lb. SCOTLAND: 5d. to 5⅜d. ex store. MANCHESTER: 5d. to 5¼d.
SULPHUR.—£9 15s. to £10 per ton. SCOTLAND: £8 to £9.
SODIUM SILICATE.—140° Tw. Spot £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £14 10s. per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 4s. 5d. to 4s. 7d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.
ZINC SULPHIDE.—11d. to 1s. per lb.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.
BENZIDINE HCL.—2s. 5d. per lb.
p CRESOL 34-5° C.—2s. per lb. in ton lots.
m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.
DICHLORANILINE.—1s. 11¼d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 01¼d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3ss. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb.: 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. to 11d. per lb.
p-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9. Grey, £12 to £14. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £11; grey, £13 10s.
ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.
CHARCOAL.—£5 to £10 per ton.
WOOD CREOSOTE.—Unrefined, 3d. to 1s. 6d. per gal.
WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 6d. per gal.; solvent, 3s. 3d. to 4s. 3d. per gal.
WOOD TAR.—£2 to £4 per ton.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 7¾d. to 8¼d. per lb.; crude, 60's, 1s. 1½d. to 2s. 2¼d. per gal. MANCHESTER: Crystals, 7¼d. per lb.; crude, 2s. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale 98%, 1s. 5d. to 1s. 6d.; according to specification. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude, 9½d to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.
CREOSOTE.—B.S.I. Specification standard, 5½d. to 5¾d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5d. to 5¾d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4½d.; heavy, 4¼d. to 4½d.
NAPHTHA.—Solvent, 90/100%, 1s. 5d. to 1s. 6d. per gal.; 95/160%, 1s. 6d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3¾d. to 1s. 4½d.; heavy, 11d. to 1s. 0¼d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £10 per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—Medium soft, 37s. 6d. per ton. LONDON: 40s. per ton, f.o.b. East Coast port. MANCHESTER: 32s. 6d. to 35s. f.o.b. East Coast.
PYRIDINE.—90/140, 5s. 6d. to 8s. 6d. per gal.; 90/180, 2s. 3d.
TOLUOL.—90%, 1s. 11d. to 2s. per gal.; pure, 2s. 2d.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 1d. to 2s. 2d.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—£7 5s. per ton; for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.
CYANAMIDE.—£7 5s. per ton delivered in 4-ton lots to farmer's nearest station.
NITRATE OF SODA.—£7 12s. 6d. per ton for delivery in 6-ton lots, carriage paid to farmer's nearest station for material basis 15.5% or 16% nitrogen.
NITRO-CHALK.—£7 5s. per ton in 6-ton lots carriage paid for material basis 15.5% nitrogen.
CONCENTRATED COMPLETE FERTILISERS.—£10 5s. to £10 17s. 6d. per ton according to percentage of constituents, for delivery in 6-ton lots carriage paid.
NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton.

Latest Oil Prices

LONDON, June 19.—LINSEED OIL was steady. Spot, £23 (small lots); July and Aug., £20 10s.; Sept.-Dec., £20 15s.; Jan.-April, £20 17s. 6d., naked. SOYA BEAN OIL was dull. Oriental (bulk), June-July shipment, £17 15s. RAPE OIL was steady. Crude extracted, £33; technical refined, £34 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian, crude, £23 10s.; refined common edible, £27 15s.; deodorised, £29 15s., naked, ex mill (small quantities £1 10s. extra). TURPENTINE was easier. American, spot, 43s. 9d. per cwt.

HULL.—LINSEED OIL.—Spot quoted £21 12s. 6d. per ton; June, £21 5s.; July-Aug., £21 2s. 6d.; Sept.-Dec., £20 17s. 6d. COTTON OIL.—Sgyptian crude, spot, £24 per ton; edible, refined, spot, £27; technical spot, £27; deodorised, £29, naked. PALM KERNEL OIL, crude, f.m.q., spot, £21 per ton, naked. GROUNDNUT OIL, extracted, spot, £32 10s. per ton; deodorised £35 10s. RAPE OIL, extracted, spot, £32 per ton; refined, £33 10s. SOYA OIL, extracted, spot, £23 per ton; deodorised, £26. CASTOR OIL, pharmaceutical, 41s. per cwt.; first, 36s.; second, 33s. COD OIL, f.o.r. or f.a.s., 25s. per cwt., in barrels. TURPENTINE, American, spot, 45s. 9d. per cwt.

Inventions in the Chemical Industry

Patent Specifications and Applications

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

(May 30 to June 6 inclusive.)

PRECIPITATED ZINC OXIDE, ETC., manufacture.—G. Antonoff. 16268.

EMULSIFICATION OF OILS.—C. Arnold (Standard Oil Development Co. 16053.

CARBONACEOUS MATERIALS, treatment.—W. H. Beeston (International Hydrogenation Patents Co., Ltd.). 15955.

HYDRO-AROMATIC AMINO-ALCOHOLS, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 15800.

AZO DYESTUFFS, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 15801.

MORPHOLINE, manufacture.—Carbide and Carbon Chemicals Corporation. (United States, July 12, '34.) 15709.

SULPHUR DERIVATIVES of acetylene polymers, application.—W. H. Carothers and E. I. du Pont de Nemours and Co. 16387.

MEDIA FOR COMBATING WEEDS.—A. Carpmael (I. G. Farbenindustrie). 15763.

LIGHT FILTERS.—A. Carpmael (I. G. Farbenindustrie). 15764.

FILTRATION OF AGGRESSIVE LIQUIDS.—A. Carpmael (I. G. Farbenindustrie). 15925.

DYEING LEATHER, process.—A. Carpmael (I. G. Farbenindustrie.) 16161.

DETERGENT, ETC., AGENTS, manufacture.—Chemical Works, formerly Sandoz. (Switzerland, June 5, '34.) 16256.

THERAPEUTICALLY-VALUABLE COMPOUNDS, manufacture.—Chemical Works, formerly Sandoz. (Switzerland, June 6, '34.) 16257.

COLLOIDAL DISPERSIONS.—Clayton and Stevens, Ltd. 16337.

IMPREGNATION OF PAPER, ETC.—E. I. du Pont de Nemours and Co. and P. L. Magill. 15880.

ISOMERISATION OF RUBBER.—E. I. du Pont de Nemours and Co. and W. E. Lawson. 16245.

FAST DYEINGS, production.—W. W. Groves (I. G. Farbenindustrie). 16377.

BENZYL-SALICYLIC ACIDS, manufacture.—W. W. Groves (Monsanto Chemical Co.). 15881.

ANHYDROUS FERRIC SULPHATE, manufacture.—W. W. Groves. 16175.

ALCYLATED PHENOLS, manufacture.—W. W. Groves. 16378.

PROCESS FOR SOFTENING, ETC., WATER.—F. Hähn. 16192.

DYESTUFFS, manufacture.—A. A. Harrison, Imperial Chemical Industries, Ltd., and H. Samuels. 16244.

ALKALI METAL PEROXIDES, manufacture.—I. G. Farbenindustrie (Germany, May 30, '34.) 15758.

ALKALI METAL PEROXIDES, manufacture.—I. G. Farbenindustrie. (Germany, May 18.) 15759.

4-AMINO-DINITRODIPHENYLAMINES.—I. G. Farbenindustrie. (Germany, June 2, '34.) 16178.

4-AMINO-DINITRODIPHENYLAMINES.—I. G. Farbenindustrie. (Germany, July 16, '34.) 16179.

4-AMINO-DINITRODIPHENYLAMINES.—I. G. Farbenindustrie. (Germany, Nov. 28, '34.) 16180.

HIGH-VACUUM PUMPS.—Imperial Chemical Industries, Ltd., and B. E. A. Vigers. 16138, 16140.

DEGASSERS.—Imperial Chemical Industries, Ltd., and B. E. A. Vigers. 16139.

HIGH-VACUUM DISTILLATION APPARATUS.—Imperial Chemical Industries, Ltd. and B. E. A. Vigers. 16141.

COLOURING MATTERS, manufacture.—Imperial Chemical Industries, Ltd. 16240.

MONOAZO DYESTUFFS.—Imperial Chemical Industries, Ltd., and A. H. Knight. 16241.

PRESERVATION OF RUBBER.—Imperial Chemical Industries, Ltd. and M. Jones. 16242.

HEAT TREATMENT OF METALS.—Imperial Chemical Industries, Ltd. 16243.

PREPARING OPTICALLY-ACTIVE TRANS-π-HYDROXYCAMPHOR.—M. Ishidate. 15762.

WASHING OUT GASEOUS WEAK ACIDS from gases.—J. Y. Johnson (I. G. Farbenindustrie). 16167.

WATER-SOLUBLE CONDENSATION PRODUCTS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 16354.

CONDENSATION PRODUCTS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 16356.

COLOUR LAKES, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 16357.

PHYTOSTERIN PRODUCTS, production.—J. E. Pollak (Hansa-Mühle.) 16182.

ALCOHOLS, manufacture.—Schering-Kahlbaum. (Oct. 22, '34.) 15923.

ACYL OCTAHYDRO FOLLICLE HORMONES, manufacture.—Schering-Kahlbaum. (Nov. 9, '34.) 15924.

VAT DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. (Switzerland, June 5, '34.) 16381.

Complete Specifications Open to Public Inspection

PERFORMING REACTIONS in the gaseous or vapour phase in the presence of catalysts, process and apparatus.—Metallges. A.-G. Dec. 1, 1933. 25602/34.

SULPHO-ACIDS AND THEIR SALTS having capillary-active properties, production.—E. A. Mauersberger. Nov. 29, 1933. 28445/34.

DYESTUFFS CONTAINING CHROMIUM, manufacture.—Compagnie Nationale de Matieres Colorantes et Manufacture de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. Dec. 2, 1933. 31273/34.

ACETIC ANHYDRIDE, manufacture.—Consortium für Elektro-Chemische Industrie Ges. Nov. 28, 1933. 31609/34.

SO_2 FROM ACID SLUDGE, production.—Chemical Construction Corporation. Dec. 2, 1933. 32787/34.

EXTRACT OF LEMON IN POWDER, preparation.—Arenella Soc. Italiana per L'Industria Dell' Acido Citrico ed Affini. Nov. 29, 1933. 31273/34.

HALOGENATED HYDROCARBON COMPOUNDS.—British Thomson-Houston Co., Ltd. Nov. 29, 1933. 33942/34.

MANGANOUS PHOSPHATE DIHYDRATE, manufacture.—I. G. Farbenindustrie. Nov. 28, 1933. 34081/34.

ACETOACEANILIDE, preparaing.—Carbide and Carbon Chemicals Corporation. Dec. 2, 1933. 34393/34.

SILICIC ACID GELS, production.—Grasselli Chemical Co. Dec. 1, 1933. 34508/34.

CYCLIC COMPOUNDS, manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Dec. 2, 1933. 34511/34.

ACRYLIC ACID ESTERS, polymerisation.—Dr. O. Röhm. Dec. 2, 1933. 34693/34.

CONDENSATION PRODUCTS, manufacture.—I. G. Farbenindustrie. Dec. 2, 1933. 34699/34.

AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. Dec. 1, 1933. 34700-1/34.

NITRIC OXIDES FROM THE AIR, methods for producing.—British Thomson-Houston Co., Ltd. Dec. 2, 1933. 34713/34.

HYDROCARBON MIXTURES, separation.—Standard Oil Development Co. June 10, 1933. 5489/35.

Specifications Accepted with Date of Application

FOAMING OF LIQUIDS, means for preventing.—Deutsche Hydriewerke A.-G. Oct. 22, 1932. 429,423.

RECOVERY OF SULPHURIC ACID by condensation, process and apparatus.—Metallges. A.-G. March 11, 1933. 429,267.

INTERMEDIATES AND AZO DYES, manufacture.—Imperial Chemical Industries, Ltd., and W. A. Sexton. Nov. 21, 1933. 429,430.

FUNGICIDAL BODIES and their application, manufacture.—Imperial Chemical Industries, Ltd., T. Callan and F. L. Sharp. Nov. 22, 1933. 429,270.

CONDENSATION PRODUCTS from urea, formaldehyde, and hexamethylene-tetramine, method of manufacturing.—W. Kraus. Nov. 25, 1932. 429,346.

SULPHUR-DYESTUFF PREPARATIONS, process for the manufacture. I. G. Farbenindustrie. Dec. 24, 1932. 429,350.

NICKEL CARBONYL, manufacture.—C. F. R. Harrison and A. E. Wallis. Nov. 28, 1933. 429,274.

EMBEDDING MASS for dental purposes.—I. G. Farbenindustrie. Dec. 1, 1932. 429,444.

WHOLLY CRYSTALLINE REFRACTORIES from zircon by fusion, production.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny and Cirey. Dec. 23, 1932. 429,367.

PURIFYING GASES by treatment with copper ammonia solutions. Chemical Engineering Corporation. March 7, 1933. 429,522.

SHAPED CATALYSTS by means of mechanical pressing, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). May 22, 1934. 429,410.

PIGMENTS.—New Jersey Zinc Co. March 2, 1934. 429,553.

RADIO-ACTIVE THREADS, production.—Dr. F. Fattinger. May 28, 1934. 429,453.

SOLUTIONS OF RUBBER, manufacture.—J. R. Geigy A.-G. Aug. 18, 1933. 429,557.

DISCHARGING DYEINGS ON WOOL, process.—Soc. of Chemical Industry in Basle. Oct. 21, 1933. 429,469.

LIQUID ANTHELMINTICS, manufacture of solutions.—I. G. Farbenindustrie. Oct. 25, 1932. 429,498.

From Week to Week

A FIRE OCCURRED on Monday at the silk factory of Fras. Hinde and Hardy, Ltd., Norwich. A new wing of the factory, constructed about eighteen months ago, in which dye works and a laboratory were situated, was damaged.

AMONG THE VICTIMS of the recent train disaster at Welwyn Garden City were Mr. William Marquis and his 12-year-old daughter. Mr. Marquis, who was an engine drive at Imperial Chemical Industries, Ltd., Billingham-on-Tees, was on holiday.

A PAPER BY DR. F. J. F. SHAW, director of the Imperial Institute of Agricultural Research, Pusa, on "Agricultural and Commercial Aspects of the Oil Seeds Industry," will be read, in the absence of the author, by Dr. D. B. Meek, trade commissioner for the Indian Government, at the Royal Society of Arts at 4.30 p.m. on June 27. Sir Harry Lindsay, director of the Imperial Institute, will preside.

MANY FEATURES OF THE BRIGHT ANNEALING FURNACE mentioned in the account of the works of Henry Wiggin and Co., Ltd., published in THE CHEMICAL AGE May 25 (page 460), are the subject of patents or patent applications for cracking and partially burning the butane, and the chain screens for preventing undue loss of protective gas.

AT THE SHEFFIELD STEELWORKS of Firth-Brown and Co., Ltd., on June 14, Frank Dyke, steelworker, aged 48, was walking across a plank over a vitriol vat when he slipped and fell feet first into the vat. He sustained burns about the legs and was also splashed about the face. Workmates dragged him out and he was taken to hospital, but his condition is not serious.

A NEW EDITION of "Road Notes, Great Britain, 1934/35," containing useful statistics and other information relative to the road motor transport industry, has been issued. A limited supply has been reserved for speakers and others engaged in propaganda work on behalf of the industry, who can obtain a copy upon application to the British Road Federation, 50 Pall Mall, London, S.W.1.

IMPERIAL CHEMICAL INDUSTRIES, LTD., have issued particulars of a new form of tent, known as the improved "750" pneumatic tent, which has no poles, packs up sufficiently to be stowed away easily in a car, and may be erected in four minutes by inflating the tubes with a pump. The tent measures 7 ft. by 7 ft., by 6 ft. 3 in. in height, and has a "lightening" fastened door, a window to open and shut, pockets, coat hangers and a sunshine roof.

THE MICROCHEMICAL CLUB will meet at the National Physical Laboratory on July 13, at 11 a.m., when Professor H. V. A. Briscoe will give an address on a new micro-flotation method of determining liquid densities. Professor H. D. Kay will speak on a method for the detection of small amounts of improperly pasteurised milk and Dr. L. J. Harris will lecture on the titration curve method. After luncheon, parts of the laboratory will be open to inspection by the visitors.

THE THIRD WORKS FATALITY at Scunthorpe in a week occurred on June 15 at the Redbourn iron and steelworks of Richard Thomas and Co., Ltd., where one man was killed and another was injured when an accident happened inside a blast furnace which is being reconstructed at the works. Edward Beacock, bricklayer, fell over thirty feet to the bottom of the furnace and was killed outright. Edward Thomson managed to break his own fall by catching hold of a rope, and he escaped with injuries to his hands. The reconstruction of the blast furnace in which the accident happened is part of the improvement and extension now being carried out at the Redbourn works.

AN EXPLOSION OCCURRED AT THE WORKS of the British Oxygen Co., Ltd., at Crewe, on June 15, when the roof of the works was lifted into the air, and windows of houses in the neighbourhood were blown out. Only four men were in the works at the time. John Wharton, of Shavington, was rescued from the filling station by E. Lewis, the foreman of the works. Lewis discovered Wharton on fire and assisted him to some long grass in the works ground, where he rolled him over until the flames were extinguished. The shock of the explosion was felt nearly a mile away, and windows of houses and shops were smashed over 300 yards from the works.

AT THE ANNUAL COURT OF GOVERNORS of the Royal Commercial Travellers' Schools held in London on June 14, it was announced that Sir Ernest Benn's successor as appeal president in 1936 would be Mr. Clarence E. Bartholomew (chairman of Bryant and May, Ltd.). Mr. E. Burrell Baggallay, who has been associated with the work of the schools for twenty years, was elected president for three years in succession to Mr. F. D'Arcy Cooper. On his proposition votes of thanks were accorded to Mr. D'Arcy Cooper and to the retiring trustees, Lord Wakefield, Lord Hollenden, and Sir Jeremiah Colman, who were elected patrons for life. Sir Ernest Benn, in securing the adoption of a motion for the re-election of Capt. The Hon. Claude Hope-Morley as treasurer, complimented the governors on the spirit in which they chose their officers.

A NEW COMPANY is to be formed, called Amalgamated Oxides, Ltd., as a result of the amalgamation of the Zinc Manufacturing Co., Ltd., N.C. Metal Co., Ltd., and the Metallic Ore Reduction Co., Ltd., which manufacture zinc products under the "Coley Process." Resolutions for the voluntary liquidation of each company were approved on Monday.

THE BOILING OVER OF A PAN OF VARNISH led to a serious outbreak of fire at the works of James A. Kemp and Co., varnish manufacturers, Seacombe Ferry, Wallasey, on June 15. Huge quantities of varnish, turpentine and benzine were destroyed and the flames rose to a great height. The works cover an area of half an acre.

PAPERS READ OR PUBLISHED by the staff of the National Physical Laboratory during May, included "The iodine method for the determination of oxides in steel," by T. E. Rooney and A. G. Stapleton (Iron and Steel Institute, May 1), and "The behaviour of engineering materials at high temperatures," by H. J. Tapsell. (Published in the "Proc. Rugby Eng. Soc." *28*, 13.)

A FOURTH AND ENLARGED EDITION of the "B.D.H. Book of Reagents for 'Spot' Tests and Delicate Analysis" contains particulars of the uses of 67 reagents, which is nearly twice the number described in the first issue, published in 1932. All the original monographs have been revised and amplified in order to embrace the latest researches in this subject. There has been a large and very satisfactory demand for the earlier editions of the book, which seems to be an indication of the widespread interest taken in the technique of this special branch of analytical chemistry.

A RESOLUTION AGAINST COMPULSORY GAS MASK DRILL was passed by the Executive Council of the Chemical Workers' Union in London last week. Copies are being sent to the Prime Minister and Secretary of State for War. It protests that the introduction of compulsory gas mask drill for civilians will assist the Government in creating a war mentality, and that it misleads people into the belief that there exists efficient protection against gas attacks. Gas masks, it says, cannot protect populations of large towns and industrial centres which are to be the chief targets in any next war.

THE FACT that the national revenue of Chile, which annually exports about a million tons of nitrate, had been affected by the use of synthetic substitutes for nitrate, was referred to by Sir Robert Michell, the British Ambassador to Chile, in an interview when he landed at Plymouth from South America on June 9. Sir Robert said that the first idea of Chile was to meet its external obligations, which had been in default for three years, adding that there had been an improvement in the country's position and the Finance Minister was determined to renew the services and restore the reputation of the country.

THE DEFERRED SHAREHOLDERS COMMITTEE of Imperial Chemical Industries, Ltd., formed at a meeting which followed the company's meetings on May 1, has now sent out to the deferred shareholders its report on the I.C.I. scheme. They are firmly of the opinion that the scheme operates with considerable hardship on the deferred shareholders and that the valuable rights attaching to the deferred shares, which will be taken from them if the directors' scheme is confirmed by the Court, should be retained. The report says that the total funds available for the company's operations are £91,048,170. A table is given showing that the approximate amount required for dividends, including the preference dividend, would be £5,000,000 if 7½ per cent. were paid on the ordinary and 1 per cent. on the deferred; £6,650,000 if these dividends were 10 per cent. and 6 per cent. respectively, and £10,620,000 if they were 16 per cent., and 18 per cent. It is then pointed out that the 1934 revenue was £7,965,038.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—An old-established Madras firm of manufacturers' representatives desire commission agencies for chemicals, for the Madras Presidency. (Ref. No. 534.)

South Africa.—H.M. Senior Trade Commissioner in South Africa reports that the South African Railways and Harbours Administration is calling for tenders (Tender No. 565), to be presented in South Africa by July 29, 1935, for the supply of 17,700 gallons of raw linseed oil and 25,900 gallons of boiled linseed oil. (Ref. B.Y. 8043.)

Finland.—A firm of agents established in Helsingfors desires to obtain the representation, on a commission basis, of United Kingdom manufacturers of acid-resisting steel. (Ref. No. 546.)

Mexico.—A commission agent in Mexico City wishes to obtain the representation of United Kingdom exporters of colours, chemicals and accelerators for the rubber trade. (Ref. No. 556.)

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH COAL DISTILLATION, LTD. (late Leicestershire (L. and N.) Coal Distillation, Ltd.), London, S.W. (M., 22/6/35.) Reg. June 11, deb. and collateral mort. securing £20,000 and a premium not ex. 15% if redeemed before June 1, 1945, to H. Bisseker, 1 Balderton Street; general charge, and charged on lands at Newbold, Worthington (Leics.). *Nil. Sept. 11, 1934.

NON-FERROUS METAL PRODUCTS, LTD., London, E.C. (M., 22/6/35.) Reg. June 5, £200,000 redeemable deb. stock secured by Trust Deed dated May 31, 1935; general charge. *Nil. Dec. 26, 1934.

TARFROID (1931), LTD., London E.C., tar mfrs. (M., 22/6/35.) Reg. June 11, series of debs. securing £2,500 (not ex.) together with amount of any bonus payable, present issue £2,450; general charge. *£5,312. Oct. 15, 1934.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

WILLIAMS, Mr. H. (tdg. as H. Williams and Co.), 118 Vernon Avenue, Basford, Nottingham, mfg. chemist. (C.C., 22/6/35.) £14 4s. 0d. May 13.

Company News

Tarmac.—Payment is announced on July 1, on 5½ per cent., tax free cumulative preference shares in respect of the half-year ending June 30. Warrants will be posted on June 29.

Ipswich Beet Sugar Factory.—Earnings amounted to £37,249, the comparable 1933-34 balance being £24,844. The ordinary dividend is up from 6 per cent. to 7 per cent., both tax free, while the reserve transfer is increased from £844 to £9,249.

King's Lynn Beet Sugar Factory.—A net profit of £53,841 is reported against £17,699. The ordinary dividend is raised from 6 per cent. to 8 per cent., tax free, while reserve receives £17,841, the previous allocation being £20,699.

Home Grown Sugar, Ltd.—This undertaking, which has a working agreement with the English Beet Sugar Corporation, reports an extension of the agreement for a further year, pending Government action on the "Greene" report. Net profit for 1934-35 is shown at £15,526, against £7,275 last year. The dividend is repeated at 5 per cent. and £8,251 is transferred to reserve.

Ely Beet Sugar Factory.—The net profit is shown at £97,504, against £93,515 in the previous year. The ordinary dividend is raised from 12½ per cent. to 15 per cent., tax free, while reserve receives £30,004, compared with £37,265.

Neuchatel Asphalte.—The net profit for 1934 was £24,177, against £11,135 in 1933. The ordinary dividend is doubled at 2½ per cent. and the amount carried forward is £53,873 compared with £50,193 last year.

English Beet Sugar Corporation.—A total income is reported of £238,694, against £171,705 for 1933-34, although the former figure includes £35,000 profit on investment sales. Net profit is up from £110,598 to £191,593, and the reserve allocation from £35,598 to £91,593. The dividend is up from 15 per cent. to 20 per cent., tax free.

"Sanitas" Trust.—The net profit for the year to May 31 last, amounted to £57,990, against £57,852 in 1933-34. The preference dividend takes £49,500. Off capital reorganisation expenses, £1,080; first ordinary dividend 1d. per 1s. share, tax free; leaving to be carried forward, £14,099.

Sanitas Co., S.W.—The report to March 31, states that the net profit was £70,284 (against £65,516), less tax, £3,220, leaving £67,064, plus £6,303 brought forward. The 9 per cent. dividend on preference absorbed £20,700, and dividends on ordinary £35,000, equal to 35 per cent. It is proposed to carry to contingency £10,000, leaving to go forward £7,667.

Belliss and Morcom.—The report for the year to March 31, 1935, shows profit of £16,043, against £8,284. Preference dividend for the year, £4,969 paid, and interim dividend on ordinary shares of 5 per cent., tax free, amounting to £7,328. The directors recommend a final dividend on the ordinary shares at 5 per cent., tax free, amounting to £7,328, making 10 per cent., tax free, the same as before.

Palestine Potash.—It is announced that, in view of a payment of the fixed dividend on the 5½ per cent. cumulative redeemable participating preference shares of £1 becoming due on July 1 next, it is desirable that all letters of allotment should be returned for registration to the registered office of the company, 62 Pall Mall, London, S.W.1, immediately, in order that prompt payment may be made to the persons entitled.

Associated Fireclay Companies, Ltd.—A dividend of 3 per cent. is to be paid on the ordinary shares in respect of the year to March 31 last. This is the first dividend since the 2½ per cent. was paid as an interim for 1932. The profit increased from £15,612 for 1933-34 to £17,956 for the past year, and with £9,714 brought in, the available balance was £27,670. The preference dividend requires £10,898 and the ordinary dividend £3,262, while £5,490 is written off expenses of the new issue of preference shares made in December last, leaving £8,020 to be carried forward.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following trade marks can be lodged up to June 29, 1935.

Granodine. 557,623. Class 1. Chemical substances for the treatment of metal surfaces so as to obtain improved resistance to corrosion of the surfaces when subsequently painted. Nobel Chemical Finishes, Ltd., Imperial Chemical House, Millbank, London, S.W.1. February 1, 1935.

Piodent. 559,601. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. Casebourne & Co. (1926), Ltd., Imperial Chemical House, Millbank, London, S.W.1. April 16, 1935.

Aspro. 559,522. Class 2. Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Aspro, Ltd., Buckingham Avenue, Trading Estate, Slough, Buckinghamshire. April 12, 1935.